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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOLUME II.

JANUARY TO DECEMBER 1903.

ISSUED UNDER THE AUTHORITY OF THE
COMMISSIONER OF AGRICULTURE FOR THE WEST INDIES.

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AGRICULTURAL NEWS.

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IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

Vol. II. No. 19. BARBADOS, JANUARY 3, 1903. Price 1*d*.

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Agriculture in the West Indies in 1902.

THE *Agricultural News* commences, with the present number, its second volume. Started so recently as April last, the *Agricultural News* is one of the youngest of the journals devoted to tropical agriculture. Its primary object is, as stated in the opening number, to supply 'in a popular form information of an agricultural character suited to the requirements of the West Indies.'

This aim has been consistently kept in view, but the final verdict as to how far it has been attained rests with our readers. Judging by the many appreciatory criticisms which have been passed on the *Agricultural News* in the West Indies we feel entitled to claim that it has achieved some measure of success. Its influence has not, however, been confined to the West Indies. The *Agricultural News* has gained a recognized position amongst the Agricultural Journals of the world and is quoted from in such widely separated lands as Australia, India, Canada, the United States, Hawaii, in addition to the Mother Country. In this way accurate knowledge of the agricultural condition of these colonies and their rich capabilities is being widely disseminated. One indirect result of the *Agricultural News* may well be an increased interest in West Indian Agriculture, leading, we trust, to the attraction of men and capital to these colonies.

The past year will long be memorable in the annals of the West Indies. During its earlier months the reports of the Proceedings of the Brussels Conference were eagerly followed. The close of the year saw the adoption by the British Parliament of the resolution embodying the principle of abolishing the sugar bounties. West Indian sugar planters see now within measurable distance that day, for which they have striven so long and so earnestly, when cane sugar and beet sugar shall enter the markets of the world on equal terms. We trust that under these new conditions cane sugar may prove equal to the task of holding its own in the stern competition it has to face. To do so will require every economy that science and practice can suggest.

During 1902 some solid success has attended the efforts to establish industries other than sugar in some parts of the West Indies. The progress made in onion cultivation stands out conspicuously. (see *Agricultural News*, Vol. I. p. 241). Onions have been grown for some twelve years in Antigua and are now exported to a large extent. Last year Montserrat exported a considerable quantity, and successful results have been obtained at Dominica, and, within the last month, at Barbados also.

Substantial progress has also been made in cotton cultivation. (see *Agricultural News*, Vol. I. p. 273). A considerable area is now under cultivation in Montserrat, St. Lucia, and Antigua, and we hope to see cotton becoming once again a valuable crop in the West Indies.

On the educational side the year has seen marked advances. School gardens are rapidly becoming recognized features of the educational work in several of the colonies. The Department's Agricultural schools have continued to do good work. The time is approaching when every child in the West Indies will be enabled to learn, practically, the principles underlying agricultural practice.

On one point is there cause for regret. The unfortunate outbreak of small-pox at Barbados has necessitated the postponement of the West Indian Agricultural Conference. These Conferences form an opportune moment to review the work of the past year, and to indicate the efforts to be made in the future. Their value lies partly in the actual papers read, discussed, and published in the *West Indian Bulletin*. Of scarcely second importance is the opportunity afforded to the members of the band of agricultural workers scattered throughout the West Indies to meet and talk over their respective lines of work. The importance of the informal discussion and criticism by experts of one another's work, cannot be gauged by any ordinary standard. It is, none the less, a real factor in breaking down that sense of isolation which is one of the hindrances to unity of aim and progress in the cause they all have at heart, the improvement of agricultural conditions in the West Indies.

SUGAR INDUSTRY.

Notes on Hatching and Planting Cane Cuttings.

Mr. F. R. Shepherd, the Superintendent in charge of Sugar-cane Experiments at Antigua, contributes the following notes on the treatment of cane cuttings:—

'Cane cuttings that have very prominent eyes, such as from seedlings D. 95, and B. 208, or that have been hatched so as to start the eyes, very often fail to grow owing to careless handling and planting.

Cuttings hatched, or with prominent eyes, should be handled as little as possible, and planted with great care so as not to injure the eyes.

The general practice on estates is to use a drill or crowbar for planting, and the cutting is often forced into a hole much too small for it; the eyes are injured, and the plant fails to grow.

A plan that can be recommended for hatching cuttings is to tie them up in small bundles of fifty, treat them with Bordeaux mixture and then put them to stand upright with a covering of moist, fine megass.

They readily hatch in this way, and if then taken to the field in baskets and planted with a fork or hoe, there will be little difficulty in getting cane cuttings thus treated to grow.'

Insect Attack on Young Canes.

During the past three years isolated cases have been reported where very young cane plants were damaged by a leaf-eating insect. The insect in question is a small dark-coloured weevil (*Myochrous armatus*) which lives in the cane fields and occasionally appears abundantly on the young shoots as they spring from the ground in newly planted fields. It eats the leaves, cutting them completely through in many cases, so that in dry weather the young plants fail to become established, and die. The attack is usually evident about this time, and though the beetle can be found in the cane fields at all times, it is only injurious when it attacks the very young shoots. Hitherto little damage has been caused, the fields, on being 'supplied,' not suffering from a renewal of the attack.

This note is published to give information to those who may notice their young canes attacked. The beetle will only be found in the early morning or late in the evening, as it feeds by night and passes the day in the soil. As its colour is precisely that of the soil, it is useless to attempt to discover the beetle in the day time, and if the canes are found to be eaten, a search should be made in the early morning when the beetles will probably be seen on the young shoots.

Moth Borer in Louisiana.

Bulletin No. 70, of the Louisiana Agricultural Experiment Station contains a full account of the moth borer by Messrs. W. C. Stubbs and H. A. Morgan.

The attack on both cane and Indian corn is discussed, and the information obtained by circular from a number of Louisiana planters is included. The attack of the insect on cane became very marked in 1900, and led to a demand for a full investigation of the pest. The damage is variously assessed at from five to fifteen per cent. of the total yield in plant canes. The life-history differs from that observed in the West Indies, and this is attributable to the difference in climate; but there is no radical difference, save in the time occupied in the various stages.

Remedies, based on the habits of the insect and on the routine of estate work, differ markedly from those found useful in these islands, and are mainly inapplicable under West Indian conditions. The cutting out of 'deadhearts' seems to give good results, and the burning of trash and tops is looked on as the most valuable means of fighting the pest. Other remedies have reference to the practice of fall planting and the beneficial action of the cold winter in destroying hibernating insects. Natural enemies are present in greater variety than in the West Indies, but the very useful egg parasite *(Trichogramma pretiosa)* is not known in Louisiana. A fungus was found attacking the caterpillars, and an attempt is being made to utilize this on a practical scale.

In general it appears that the problem in Louisiana is very similar to that in the West Indies. There, as here, the successful control of the pest is probably a matter of reasonable vigilance and care on the part of those who grow sugar-cane and corn. Just so far as the planter is willing to adopt precautions will the borer be kept in check, and natural enemies or other checks will help him to only a limited extent.

COTTON IN ST. LUCIA.

The following is the report on cotton cultivation in St. Lucia, referred to on page 9 as being presented to the meeting of the St. Lucia Agricultural Society on December 12:—

1. We have the honour to submit our report on the cotton cultivation of the Choiseul quarter for the year 1902.

2. We visited 84 plots of cotton in various stages of growth, as against 40 last year.

3. Many of the plots (visited) are small, and do not show forth the amount of attention necessary to make a business of the attempt.

4. None of the cotton visited last year was taken into account this year for prizes.

5. We estimate the acreage inspected this year at about 75 acres which, added to last year's will give a total of 105 acres.

6. A great deal of seed planted did not grow. This has been attributed (a) to *old* seed, (b) to seed *crushed*, in passing through the Gin, (c) Ground crickets *eating* the seed, (d) seed *sodden* by too much rain.

7. The prizes have greatly stimulated the industry, and should be continued from three to five years (if found necessary). Last year no one answered the notice to report his cotton for inspection; taxation of some sort was suspected; this year we had forty applications within a week of notice.

8. Considering that the whole southern seaboard (from the foot of the Pitons up to Vieuxfort) about 15 by 3 miles, is excellent soil for cotton and that it can be grown at about one-fourth of the cost of cane, it is strange that none of the large plantations have tried it.

9. Riviere Dorèe is the great centre of the enterprise. The proprietor contracted, in June (this year), with his tenants to plant cotton as a staple. Consequently, nearly the whole of this estate is planted up, and should even this comparatively moderate progress continue for another year, the Gin with its animal motive power, will be quite inadequate to the demands which will be made on it. The experiment station contains about 4 acres of various varieties of cotton under excellent growth.

10. The only real difficulty for agriculture is the existing unprofitable markets. This hás disheartened landlords, and tenants drop down in proportion. The trouble of the new industry is the initial outlay. This cannot be obtained while there is no guarantee that the crop will reproduce it. The landlord being thus unable to lead, the labourer should be encouraged from all other available sources. If a moderate market can be found the fullest extent of the cotton cultivation in this quarter is assured.

11. We found about 5 acres of very fine cotton on the Balembouche estate. The occupier stated that the cotton was his own, and not planted for the proprietors. It would have taken the first prize, but as our instructions applied to tenants and peasant proprietors, we can only recommend this planter to the consideration of the Agricultural Society.

The Report concluded with a list of persons recommended for the prizes to the value of £23, offered by the Society.

Clover Cutters in Dominica.

Mr. D. Tannock, the Officer in charge of the Dominica Agricultural School, writes:—

Among the tools and implements recently imported by the Imperial Department of Agriculture from the United States and set up at the Agricultural School were one or two clover cutters for cutting up green food for poultry.

We find that chickens will not eat the chopped up green food when they have a free run and get plenty of grass. When, however, all the grass is burned up during the dry weather, they take it readily. The common red or white *Amaranthus* does very well chopped up and mixed with the soft food given in the mornings.

The 'Large Flock' cutter can be used for cutting up cane tops for stock feed.

Alfalfa or Lucerne at Montserrat.

An experiment with the above has just been concluded at Grove Station, Montserrat.

The land, which is light gravelly, was spaded and the seeds were sown with a 'Planet Jr.' drill in August 1901. The rows were 20 inches apart. One weeding was given after each cutting.

Cuttings were made in November 1901, January, February, May, June, August and October 1902. The total yield fourteen months from sowing was equal to 46,454 lb. per acre of green fodder.

The area of plot was 4,140 ft. or about $\frac{1}{10}$ of an acre.

Crushed bone at the rate of 10 cwt. per acre was applied in August 1901, and kainit and basic phosphate at the rate of 3 cwt. of each per acre, were applied in June 1902.

WEST INDIAN FRUIT.

CULTIVATION OF BANANAS.

The following extracts from the Hon'ble W. Fawcett's paper on 'The Banana Industry of Jamaica,' deals with the care of suckers after they have been planted. See also page 261 of Vol. I. of this Journal :—

TREATMENT OF SUCKERS.

Reason for Pruning :—Pruning away such suckers as are not intended to yield fruit is a most necessary and important operation. It should be done when the sucker is not more than two or three feet high. The larger the sucker grows, the more food-material it abstracts from the parent bulb, and the more its young roots interfere with the root-system of the plant—in both ways injuring the future bunch.

Method :—Care should be taken when cutting away the sucker to apply the cutlass so that it does not point towards the plant, otherwise it is very easy to do injury. If the sucker is not cut away quite down to the white, hard part, it will soon spring again, and therefore time and labour are saved by doing it thoroughly at first.

Choosing and Timing :—Suckers shoot from the newly-planted bulb from eyes all round, and sometimes from the centre. Some planters cut away the central sucker ; others leave it, as it gives a fair bunch if the bulb is vigorous. On the south side in irrigated land, two or three suckers may be left at equal distances round the bulb. It is well to take those that start from eyes placed low down so that the roots have a good hold on the ground. One sucker takes the lead, as a rule, and becomes the plant, fruiting in ten or twelve months ; another comes in as a second sucker, giving a finer bunch four of five months later. Occasionally all the suckers will bear at the same time, when the bunches will not be so fine. It is the practice with some planters on the north side after planting in March and April for fruit in February or March to prune off all suckers till June, then to leave one just coming out of the ground which will fruit in the following April ; in October another is left on the opposite side of the stem, and in February another which will fruit in fifteen or sixteen months. On the south side two suckers would be left instead of one in June, October and February.

Plants vary according to soil, situation, tillage, etc., in the time they take to produce fruit, but the usual time is ten months to shoot, and two and one-half to four months more to ripen. Ratoons usually bear in fifteen or sixteen months. Judging from experience of his own estate, the planter can by careful pruning so regulate his banana walk when once established that the great proportion of the crop shall come in during the months of high prices, from March to June.

PRUNING LEAVES.

As the first leaves decay, they hang down all round, protecting the stem from the full glare of the sun. If they are cut away, the sheathing leaf-stalks on the outside of the stem dry up, and do not perform their proper function. It is well to leave them even in the shade of a banana walk unless it happens that the plants are clustered closely together, when too much shade causes the stem to lengthen out and become weak and brittle. In such a case some of the dead hanging leaves may be pruned away and some even of the living green leaves. In pruning the green leaves a semi-circular instrument is used mounted on a long handle, the convex edge is uppermost, and with this the leaf-stalk is partly cut through, when it falls over and hangs like one which has died naturally. Sometimes a leaf is seen to be growing through a bunch, and as it would, if left, cause some deformity or discolouration of the fruit, it is carefully removed from its position with the pruning tool. The hanging dead leaves should not be allowed to trail on the ground, as they encourage the production of roots coming to the surface.

NOTES ON ESSENTIAL OILS.

The following notes on some of the essential oils of interest in the West Indies are taken from the *Semi-Annual Report* of Messrs. Schimmel & Co., dated October, November 1902 :—

CANANGA OIL.

The over-production of this oil appears to continue, for great efforts are made to stimulate the demand. In purchasing crude cananga oil, it is advisable to use care, as large parcels have now been lying for several years in Holland and at Antwerp, of which the quality may possibly be deteriorating. Cananga oil does not keep very well, and for this reason over-production should be avoided.

CITRONELLA OIL, CEYLON.

Although the exporters in Ceylon consistently declare that the value of this article cannot go down any further, the fact that within the last few months the quotations have again grown weaker throws a peculiar light on the reliability of such statements. But as everything on this earth has a limit, so it may, humanly speaking, be assumed, that citronella oil has now also reached its lowest quotation; and we would recommend ample cover if only for this reason, that at the present value, which is equally unremunerative for producers and traders, the manufacture might at last be restricted. In such a case, the interested parties would no doubt take full advantage of the existing conditions. We ourselves have purchased large parcels at the present prices, and we pay special attention to this article, as we also use large quantities for the manufacture of geranoil by our patent process (German patent No. 76435).

The fact that superior quantities of essential oils are fully appreciated in perfumery and in the manufacture of soaps is confirmed by Java citronella oil, of which the consumption has recently grown enormously. The factory of which we presented a picture to our readers in our last report, has proved thoroughly reliable and capable of meeting the demand and has been able to satisfy promptly the increased requirements.

In consequence of the animating effect of these statistics, and the lack of confidence in the results of the harvest, the prices of cloves have recently advanced a little, and it is not impossible that they will remain at the present level, but a calmer view will be taken of the situation if the fact is taken into consideration, that the total stock of about 80,000 bales represents a quantity of about 5,000 tons, that is to say, a six months' supply, and that this does not include the stocks at Bombay, the most important clove market in the world.

(*To be continued.*)

AGRICULTURAL SHOWS.

Virgin Islands.

A successful Exhibition, in connexion with the Imperial Department of Agriculture for the West Indies, was held at Tortola on October 29 last. Mr. W. C. Fishlock, the Agricultural Instructor for the Virgin islands, has forwarded the following notes on the exhibits:—

Notwithstanding the drought which prevailed in the islands during the months of July, August, and September, a remarkably good collection of exhibits was brought together. The number of exhibits of farines, starches, meals, etc., was particularly noteworthy, and would seem to indicate a possible source of trade if properly handled, many of them being of considerable value as food products. Cotton was also well shown, some of the samples being remarkably good, and would seem to indicate a paying return for careful cultivation.

Owing to the drought above referred to, fruit was only sparsely shown; some excellent samples of limes, however, were to be seen A locally prepared liqueur, known as guava-berry rum, of excellent quality, seems to merit further attention. Muscovado sugar of fair quality was shown by several exhibitors. Coffee was fairly well shown by several persons.

The Right Rev. Dr. Mather, Bishop of Antigua, who was visiting the Presidency, very kindly undertook the distribution of the prizes to the successful exhibitors, at the same time making a very happy speech.

The Show appears to have been an entire success, and a great improvement on preceding Exhibitions.

Barbados.

The annual Agricultural and Industrial Exhibition of the Barbados Agriculture Society was held at Harrison College, Bridgetown, on December 20. In spite of the adverse weather of the past season, exhibits were numerous, and, on the whole, of high quality.

The Imperial Department of Agriculture offered three special prizes of $5.00 each:—

For the best collection of fruit
Mr. V. H. West, Westwood.
For the best collection of vegetables
No competition.
For the best collection of meals
Mr. Jacob Price, Christ Church.

Ten 'Diplomas of Merit' of the Department were offered for competition and nine were awarded as follows:—

Antigua Yams	Mrs. A. C. H. Bascom
Onions grown from seed	Mr. W. H. Walcott
Indian Corn	Mount Gay Plantation
Grape Fruit	Mrs. E. F. Carrington
Bananas	Mr. J. C. Gill
Honey	Mr. C. R. St. Aubyn
Roan Colt	Mr. F. W. Greaves
Buff Cochin China Fowls	Mr. Jas. C. Manning
Turkeys	Mr. Jas. W. Parris.

As usual at Barbados the excellent quality of the ground provisions, yams and sweet potatos was one of the striking features of the Exhibition. There is no doubt that local conditions are admirably suited to their production. It is to be hoped that the effort to find a market for the surplus crop may be successful. Other points of interest in connexion with this show are dealt with elsewhere in this number.

Announcements.

Amongst the announcements of forthcoming Agricultural Shows are the following:—

Antigua:—The Agricultural and Commercial Society have arranged an Exhibition for February. The actual date is not yet announced.

Barbados:—The Local Industrial Exhibition and Show of Stock for Peasant Proprietors will be held at Todds plantation, St. John's, on Tuesday, January 13.

Dominica:—An Agricultural Exhibition is announced to be held at Roseau during February under the auspices of the Dominica Agricultural Society.

Grenada:—A District Agricultural Show is being arranged to be held at St. Patrick's parish. The date is not finally fixed, but the Show will probably be held before the end of March.

St. Lucia:—A Show of Agricultural Produce is announced, to be held at the Union Agricultural School, on Friday, March 27, by the St. Lucia Agricultural Society.

Jamaica Horse Show:—As already announced a Horse Show is to be held near Kingston on February 11 and 12, (See *Agricultural News* Vol. I, p. 278.)

We shall be glad to learn from the Secretary of each Show of any further particulars or of any correction of the information here given. Most of these Shows are held by the local Agricultural Societies assisted by funds from the Imperial Department of Agriculture.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 15 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

VOL. II. SATURDAY, JANUARY 3, 1903. No. 19.

NOTES AND COMMENTS.

The Completion of the First Volume.

The end of the year is an appropriate time to conclude Volume I. of the *Agricultural News.* Future volumes will commence in January and end in December.

A full index is in course of preparation and will be issued as soon as possible, together with a title page etc., to complete the volume for binding.

Our hearty thanks are due to our contributors and subscribers for their kind co-operation in the past. We trust to obtain from all interested in West Indian agriculture that measure of support which will enable the second volume of the *Agricultural News* to be an improvement on the first.

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The Usefulness of Botanic Stations.

The *Gardeners' Chronicle* for November 29, reproduces the recent note in this Journal giving an account of the economic work carried on at Dominica Botanic Station during 1901-02. By way of comment on the list of plants distributed, the *Gardeners' Chronicle* adds: 'It will be agreed that these items go far to justify the existence of the West India Botanic Stations.'

Onions at Barbados.

In our Editorial in the issue of November 22 of the *Agricultural News* a short sketch was given of the growth of the onion industry in the West Indies. We were not able at that time to refer to any actual experiments which had been brought to a successful issue at Barbados, although aware that efforts were being made to grow onions in the colony from imported seed. To obtain success at the first attempt with a new crop great care and patience is necessary, and the more credit is due to Mr. W. H. Walcott of the Pine estate, Barbados, for the excellent onions he was able to exhibit at the recent Agricultural Show at Bridgetown. They were not quite ripe and their tops were still green and vigorous. Some measured nearly three inches in diameter and would no doubt have been considerably larger if matured.

The important point was the practical demonstration of the possibility of raising onions, of good quality, in Barbados, from imported Teneriffe seed, as has already been done in other parts of the West Indies. We trust that the cultivation of onions may succeed in Barbados so that in a comparatively short time we shall see onions figuring in the *Blue Book* as an export of the colony, whereas at present they stand as an import of the value of over £1,000 annually.

◆

Cotton at St. Lucia.

The report on cotton at St. Lucia reproduced on page 3 of this number is of special value. Incidentally it indicates the sound, practical interest the St. Lucia Agricultural Society is taking in this subject, as in others of economic importance to the colony. The attention now given to cotton in the Choiseul district of St. Lucia is shown by the large increase in area under cultivation, 105 acres being now in cotton. It is to be noted that nearly the whole of the available land of the Riviere Dorèe estate is under cotton.

The Committee point out 'that the whole southern sea-board (from the foot of the Pitons up to Vieuxfort), about 15 by 3 miles, is excellent soil for cotton and that it can be grown at about one quarter the price of cane.'

The whole report is a very interesting one and suggests that there is a profitable future for cotton cultivation in St. Lucia.

◆

Agricultural Shows.

During the past fortnight the Annual Exhibition of the Barbados Agricultural Society has been held and is dealt with elsewhere in this number. Some notes have also been received of the Show held at Tortola. The Virgin Islands are a very isolated dependency of the British West Indies, and it is the more gratifying to find that good samples of cotton, meals, etc., were to be seen at the Exhibition. Some honey was also exhibited and gained favourable comment.

Before the issue of our next number the local Agricultural Exhibition, held by the Department, in Barbados, will probably be over, it having being arranged for Tuesday, January 13, at Todds plantation.

These local Shows of the Imperial Department of Agriculture are essentially for small proprietors, and estate labourers. The two already held in Barbados have resulted in bringing together excellent collections of vegetables, provisions, fruits, etc. At the first Show a considerable proportion of the produce was in a rather rough state, the fruit badly pulled and some of the vegetables in poor condition. It was clearly pointed out to the exhibitors how produce should be brought, and last year it was gratifying to notice a distinct improvement in the exhibits in this respect.

A list of forthcoming West Indian Agricultural Exhibitions will be found on page 5.

The Work of Agricultural Instructors.

From Dominica Mr. Geo. Branch, the Agricultural Instructor, thus encouragingly writes on the result of his work among peasant cultivators in that island:—

'The cacao fields owned by peasants in the La Plaine district are gradually being improved and more interest is now taken in the cacao trees generally.' Referring to the Vielle Case district he adds: 'At Reposoir I visited a field of cacao that had been pruned some time previously under my directions. Mrs. Simons, the owner, expressed her intention of continuing the work as the field had given good results. I met several peasant cultivators in this district and had a chat with them. I also demonstrated on pruning cacao trees, forking the land and bedding the weedings, and showed the people how to ferment their beans properly. On leaving I was offered payment for my services. This is the second time peasant cultivators have offered to pay me. I, however, promised to return to Vielle Case before the close of the season.'

Plant Wanderings.

An interesting example of a plant finding a congenial home in a new country was brought to notice some little time ago in Barbados. In the garden of Bay Mansion, Bridgetown, a tall shrubby plant is thriving, which proved on examination to be *Nicotiana glauca*, a close relation of the tobacco plant. This species is a native of Argentine and other parts of South America. How it reached Barbados is unknown. It is now apparently well established and young, self-sown, seedlings come up freely.

Müller in his *Select Extra Tropical Plants* says 'This quickly growing, arborescent species can be raised on mere sand on the coast, as one of the best of plants to establish shelter and stay the shifting of sand waves.'

It may be that one day this casual visitor will become of economic importance in the West Indies.

Insect Control in the United States.

The United States in many instances have stringent State laws to check the introduction and spread of insect pests.

As an example of the working of these laws, an article in the *Tacoma Ledger* testifies to the destruction, by burning, of 50,000 apple trees sent to the State of Washington from New York State, and found on arrival to be diseased. Under the State laws, the whole consignment was destroyed and not a single tree allowed to pass in. 'Had the trees not been examined and been allowed to scatter over the State and planted, in the words of the Fruit Commissioner, it would have cost the State millions of dollars to have restored the tone of the orchards to where they are to-day.'

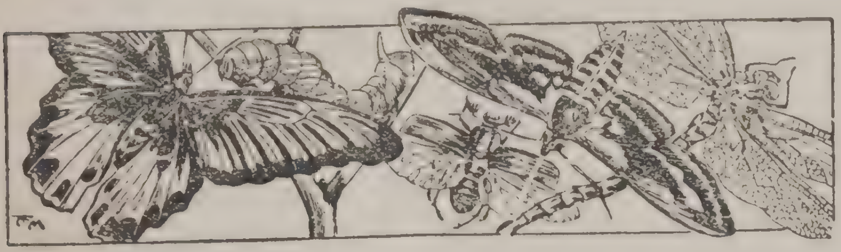
Having decided that new diseases are not to be introduced, the necessary powers are at once granted to carry the principle into effect, in this case with notable success. It may be added that in the State where the trees were grown, all nurseries are inspected and granted certificates of freedom from disease. In this case the inspection law was insufficient, and had it not been for the more stringent laws of Washington, great harm would have resulted.

Market Value of Vanilla.

In several parts of the West Indies considerable attention has been given recently to vanilla. In particular has this been the case in Dominica, where owing to the keen, practical interest taken by Mr. J. Jones, the Curator of the Botanic Station, the cultivation has been carried right through all its stages. The cured beans were sent to London and obtained a favourable report (see *Agricultural News*, Vol. I, p. 135). The experiments are being actively continued during the present season, and the boys of the Agricultural School are engaged in curing the beans (see *Agricultural News*, Vol. I, p. 276).

The vanilla plant grows well in the island and several planters have made steps to engage in its cultivation. Recently a rumour seems to have been circulated, that owing to the artificial preparation of *vanillin*, the flavouring principle of vanilla, the natural product was practically worthless; 6*d*. per lb. being mentioned as its price. Improbable as this statement seemed, the Department consulted Messrs. Brookes and Green, the well-known firm of Brokers in London. They write:—

> Concerning Vanilla market and artificial substitutes, we beg to inform you that owing to a very large crop of vanillas from Seychelles, the price dropped very considerably from September 1901 to March 1902.
>
> At the time of writing this letter prices are rising, and we think will keep firm through the summer. You may contradict authoritatively, that either 'Vanillin' or any other artificial competitor was the cause of the decline.
>
> Referring to our letter of July 21, 1902, giving values of the sample vanillas you sent over, these valuations we repeat to-day, viz: from 3*s*. to 7*s*. per lb; the mention of 6*d*. per lb. as a rumour, is altogether wrong.



INSECT NOTES.

The Frangipani Hawk-Moth.

(Pseudosphinx tetrio. L.)

Among the more striking and familiar of West Indian insects is the caterpillar of the frangipani hawk-moth. It is found on the yellow bell flower *(Allamanda)* and on frangipani in Demerara, Jamaica, St. Vincent, Dominica, Montserrat, St. Kitt's and Antigua, and rarely in Barbados. This caterpillar is very large, of a black colour with a red head and red feet, and with prominent yellow bands round the body. At the hind end is a red patch with a slender horn-like appendage. The size and beautiful colouring of these caterpillars make them striking objects, and when abundant, they are the more noticeable for the damage they do in stripping the frangipani trees of their leaves.

This caterpillar has a peculiar interest from the fact that it gave rise to the theory of 'warning colouration.' Bates, who collected in the Amazons, was struck by the very noticeable appearance of these caterpillars and mentioned the fact to Darwin, who applied to Wallace for a reason for this very conspicuous colouring in the caterpillar. Wallace concluded that the colouration was a protection to the caterpillar, in that it served to warn birds that the caterpillar was not good to eat. A bird eating such a gaudily coloured insect and finding it nasty would in future pass by a similar caterpillar, associating its bright colouring with the nasty flavour. As a matter of fact it was found that birds would not eat brightly coloured caterpillars and that there were numbers of peculiarly coloured insects which enjoyed this immunity. Those who wish to read the original account may find it in Darwin's *Descent of Man*: it is also reprinted in the *Journal of the Institute of Jamaica*, Vol I, page 31.

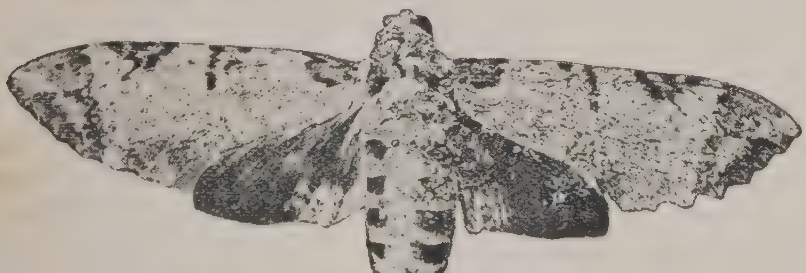


FIG. 1. THE FRANGIPANI HAWK-MOTH.
Moth from above, half natural size.

The caterpillar on becoming fully grown descends to the ground, enters the earth and spins a light cocoon. In three weeks the moth emerges. The moth is grey in colour, the under-wings darker; it has the long narrow wings and long proboscis of the hawk-moths, and flies very rapidly. They become active at dusk, lying hidden during the day.

This insect is quite worth careful observation and the caterpillars may be readily reared in captivity. They should be kept in a box covered with muslin, and fresh leaves should be put in twice a day. If a few inches depth of earth is put in, the caterpillar will readily change to the chrysalis and the whole life-history, typical of all the moths and butterflies, may easily be observed.

Hardbacks.

'Hardback' is the popular generic name for a number of beetles, usually those similar to the 'cockchafer,' 'June bug' or 'May beetle' of England and the United States. These beetles are all closely allied to each other, and have similar habits. The hardbacks of the West Indies are moderate-sized beetles classed with the May bugs, Scarabœids or Lamellicorns; they are black or brown in colour, the body rounded, the wing-cases smooth or slightly pitted, and the feelers *(antennæ)* with a small club composed of leaflets closely packed together. They attract general notice owing to their habit of coming indoors to lamps and flying booming about till they collide violently with some one or something. There are several species in the West Indies varying in size and colouring: some are light brown, others deep brown, and one is black. All have the same habit and are named 'hardback' alike, the differences between individual species being often small and not generally noticed.

This group of beetles is interesting from the large size some attain. The 'Dominica' or 'Hercules' beetle is the best known to West Indians, and the many 'rhinoceros beetles' are familiar in Demerara and some of these islands.

It is fortunate that these large beetles are not so common as the little ones. If the Hercules beetle had the same habit of flying about indoors as the 'hardbacks' have, it might prove a serious household pest; the large horns and the tubercles that these beetles are armed with, combined with their weight and hardness, would make them very formidable. This family, the *Scarabœidae*, are roughly divided into two groups according to their habits. Of the first, the Lamellicorn Scavengers, we have but few in these islands. Most of the West Indian species belong to the second group or Lamellicorn Leaf Chafers, though the name is hardly applicable to them. The grubs are found in the earth or in decaying wood and vegetable matter; they are white, fat, worm like creatures with long legs, and they usually have an unpleasant, soft, curled-up appearance that suggests that they are good eating. The grubs of the large beetles grow to a great size, and the decaying timber in Dominica clearings may be found to contain large numbers of white Scarabœid grubs. Probably the life-history of a beetle such as the Hercules is very long, covering several years possibly; that of the smaller hardbacks takes nearly a year, and that is a long period for an insect's life in the tropics. The Scarabœids, as a whole, are a very interesting group of beetles. There appear to be many species in the West Indies, both large and small, though none have yet been recorded as in any way destructive to our crops.

AGRICULTURAL SOCIETIES.

St. Lucia.

Mr. Geo. S. Hudson has kindly contributed the following account of the meeting of the St. Lucia Agricultural Society of December 11 last:—

Sir. Geo. Melville, K.C.M.G., presided, and Dr. Morris, C.M.G., the Commissioner of Agriculture for the West Indies, being present, the meeting was one of unusual interest and was largely attended.

COTTON AT CHOISEUL.

A report by the judges in the recent competition for prizes (value £23,) for best cultivations of not less than ½ acre showed an estimated increase of from 30 acres in 1901 to 105 acres in 1902, all being in peasant hands. Dr. Morris informed the meeting what was being done with cotton in the Leeward Islands, and was of opinion that, with a little more nursing from the Society, the cotton industry would become firmly established in St. Lucia.

AGRICULTURAL EXHIBITION AT UNION.

The Curator of the Botanic Station submitted a scheme of prizes for an exhibition to be held at the Agricultural School on the last Friday in March next, open to the whole island. Dr. Morris promised a grant of £25 from the Imperial Department of Agriculture which was supplemented by a vote of £20 from the Society.

IMPORTATION OF PURE-BRED PIGS.

An application was made by the Dennery Agricultural Society for a vote of £5 to purchase a pair of Tamworth pigs. Acting on the advice of Dr. Morris, the Society voted £6 for the importation of a Berkshire boar as more advisable.

IMPORTATION OF HEREFORD BULL.

An application from the Soufrière Agricultural Society for a bull of a Dairy Breed was considered, and it was decided to import a Hereford bull in preference, for that branch, at a cost of £36.

AIDING BEE CULTURE.

A grant of £6 was made to the Dennery Agricultural Society to enable that branch to keep a honey extractor on hire in the locality, and to enable three new men to purchase bee appliances for a start, on the instalment plan.

TORONTO EXHIBITION.

Dr. Morris informed the meeting that he had lately visited Canada and that the exhibits from the West Indies had been appreciated. He advised that in future they should be continued, exhibits being confined to inexpensive samples of products which the island could supply in commercial quantities.

Dominica.

We are indebted to Mr. A. K. Agar, the Secretary of the Dominica Agricultural Society, for the following notes:—

A well-attended meeting of the above Society was held at the Court House on Friday, December 5, at which Dr. Morris gave a very interesting address. He touched on the work of the various branches of the Department of Agriculture, the export of fruit, Arbor Day, and several other interesting subjects. There was a short general discussion at the close of his speech and the meeting terminated with a hearty vote of thanks to Dr. Morris.

SCIENCE NOTES.

Pitcher Plants as Cockroach Traps.

The American cockroach is an enemy to orchid plants in the West Indies. In the October number of the *Bulletin of Miscellaneous Information, Trinidad* Mr. J. H. Hart, in connexion with the question, writes:—

We have recently observed the help given to the cultivator in the destruction of these depredators by the various species of *Nepenthes* or Pitcher plants. As they assume full development, the pitchers developed on the end of the leaves become filled with liquid, into which the cockroach is apparently attracted and eventually drowned. The liquid (contained in the pitcher) is of a similar character to the gastric fluids of the human stomach and renders any animal matter fit for absorption by the plant, so that the cockroach is ultimately digested as plant food.

The *Nepenthes* have been found to be so useful for this purpose that it has been deemed advisable to largely increase the number of these plants among orchids, as the damage done by the cockroach has been largely decreased by their aid. The plants are grown in suspended baskets in a similar manner to orchids.

Caffeine in Coffee.

It has long been known that coffee berries usually contain something like one per cent. of caffeine, the substance to which coffee owes its stimulating properties. Recently M. Bertrand of the Pasteur Institute has analyzed nine kinds of coffee with interesting results. The beans of one species (*Coffea Humblotiana*) contained no caffeine, and in another species (*C. mauritiana*) only 0·07 per cent. was present. These two varieties are thus for all practical purposes free from the stimulating alkaloid. In Arabian coffee (*C. arabica*), obtained from various sources, the caffeine present varied from 0·83 to 1·60 per cent. Liberian coffee (*C. liberica*) yielded between 1·06 and 1·45 per cent. The new African coffee (*C. stenophylla*) appears very rich in caffeine, 1·52 and 1·70 per cent. being the results of two analyses recorded. *Coffea Canephora* gave the highest caffeine content, 1·97 per cent. The paper may be found reprinted in *L 'Agriculture pratique des pays chauds*, Year II., pp. 211-13.

Volcanic Debris at St. Kitt's.

Mr. J. Belling, the Science Master of the Grammar School, St. Kitt's, writes:—

A fortnight after the first eruption at Martinique the coral beach on the windward side of St. Kitt's was strewn with small lumps of pumice of various colours. Later on masses of a slag-like substance were cast up by the waves together with lumps of carbonized material, possibly sugar, large quantities of wood and articles with French inscriptions. The pumice was accompanied by an unusual quantity of fresh Spirula shells. Dust obscured the sky on several occasions and could be collected from a polished table.

Camphor Seeds.

The Curator of the Botanic Station, Dominica, would be glad to learn if fertile seeds of the camphor tree, *Cinnamomum Camphora*, are procurable in any part of the West Indies.

POULTRY.

Former issues of the *Agricultural News* have contained contributions from Mr. J. Barclay on the Breeds of Fowls, and such important subjects as Feeding, Housing, Diseases. In this issue he deals with 'Sitting Hens.' An article in the next number on Rearing Chickens will probably conclude the present series :—

SETTING OF HENS.

Whether you have Leghorns or Minorca hens, which are non-sitters and very rarely become broody; or Plymouth Rocks, Orpingtons, or Games, which become broody readily, your dependence for sitters will be on a few common fowls kept principally for that purpose. It would not be judicious to set your best layers and thus lose their services for twelve weeks or more; your more valuable fowls like Plymouth Rocks and Indian Games you would put off the sitting fever by separating them from other hens and keeping them off the nest until they lose the desire to sit. This generally happens within a week, and in another two weeks they begin to lay again. A good method is to put them in a bottomless coop, standing on grass, and in sight of other hens, giving plenty of water to drink and feeding no corn, only rice and house scraps. Still, it is not desirable to thwart nature altogether and never set your broody hens of good breeding. At the end of a season, say about June or July, it is as well to indulge the desire if they want, and then as they will moult about September, they will get a good rest and start to lay afresh, some time in November or beginning of December. But in the months from December to May, which is the best period for hatching and raising chickens, if these valuable fowls want to sit, do not allow them to do so, but set common fowls which cost only about 2*s.* (say 50c.) and whose egg-laying is so limited that they would not be missed. They, however, make good sitters and good mothers.

FORM OF NEST.

I will not speak of the use of incubators here, as they are only to be used where a large flock of fowls is to be raised, and the subject would form a chapter in itself. You must set hens where they will not be disturbed, and where the other hens cannot have access to them, in case they go and lay fresh eggs in the same nest. You must make the nest comfortable, and the success of hatching may depend upon the nest. The hens like to scrape out a saucer-shaped hollow in the damp earth, with perhaps a few leaves scraped in it and lay there. Earth makes the best foundation for the nest. Take two or three shovels-full of soft earth, free from stones, mix a little lime or wood-ash through it, hollow out saucer-shape, line with dry grass, leaves, or straw, set your hen in the evening and shut her up; take her off for fifteen minutes every morning or fore-noon, for the first week, not less than twenty minutes for the second and third week, and it will do no harm in our warm climate for her to be off thirty or forty minutes after the first few days: it will keep her fresh and stronger. Feed her on hard food, corn, rice, peas; let her have cool, clean water, and put her back for the first two or three days until she knows her nest. Do not feed soft food at all to a sitting hen. It saves time and acts well to set two hens at the same time; then when they hatch, the chickens can be given to the larger bird, and another batch of eggs put under the other hen. This prevents the waste of time of one hen going with a few chicks in case of a bad hatch. But during the second three weeks, the sitting hen must have longer spells off the eggs in the heat of the day, say forty minutes, and with an outside temperature of 85 to 90 degrees F.: this is good for hen and eggs. A turkey-hen makes a good incubator for hen eggs and can cover twenty to twenty-five, but she is not a careful mother, as rats can pick chickens from under her, which they seldom dare with hens. A very good plan is to make the turkey-hen do the incubating and have hens sitting, if even only for a week ready to take the chicks. Hens with Game blood make the best sitters and most careful mothers, and they will generally be willing to mother chicks even if they have only set upon a nest egg for a few days.

ENEMIES OF SITTING HENS.

Fowl-lice are the worst enemies of sitting hens, and once they get into a place it is difficult to get rid of them. The lime and wood-ash in the nest help to keep them off, and there are many other things used which are effective; but if the fowl-lice are present first before these have been used, prevention is so much better than cure, that most of the remedies will have no effect on hosts of lice, and there is nothing but for to shift the nest. Insect powder to be bought at a chemist's, kerosene, camphor, onion leaves, cedar leaves, or cedar sawdust, soursop leaves, are all things that, if used about the nest, will help to keep lice away to a greater or less degree. But if you set your hen with fowl-lice on her, and without dusting her with insect powder to kill them, there is no remedy but to take the eggs from the nest, and put them under another hen in a different place; or, if you have not another hen ready, put the eggs away in a warm cloth, pour boiling water on the old nests and all about, make a new nest quite away from the old spot, sprinkle a little kerosene under and around it first, dust the hen with insect powder, let her run and dust herself in the earth for a while, make a little mixture of lard and kerosene, daub a little of the mixture on the back of the hen's head, also at the end of her back just at the tail, and under her wings, and put her on the new nest. Any lice remaining on her, will be caught shortly on the lard, and the kerosene will kill them. Cleanliness will keep off fowl-lice.

Bougainvillea.

A large number of flowers depend on insect visits for the proper performance of their functions, it being by these visits that the pollen is conveyed from the anthers of one flower to the stigma of another, resulting in pollination and fertilization.

In order to secure these visits plants with insect pollinated flowers have adopted several attractions. In some, nectar is produced which serves as food for the insects, other flowers possess sweet (or sometimes offensive) odours. In most cases the possession of bright colours serve as the attraction to these useful visitors. Generally speaking some part, or parts, of the flower itself is brightly coloured. In some plants, the flowers themselves are small and inconspicuous, but certain leaves stand near the flowers, and known as bracts, are brightly coloured and so serve to attract insects to the flowers.

Good examples of these brightly coloured bracts are shown in the different species of *Bougainvillea* (see figure below) natives of South America. Here we get groups of three small flowers and each group is surrounded by three lilac coloured bracts which render the group of flowers highly conspicuous.

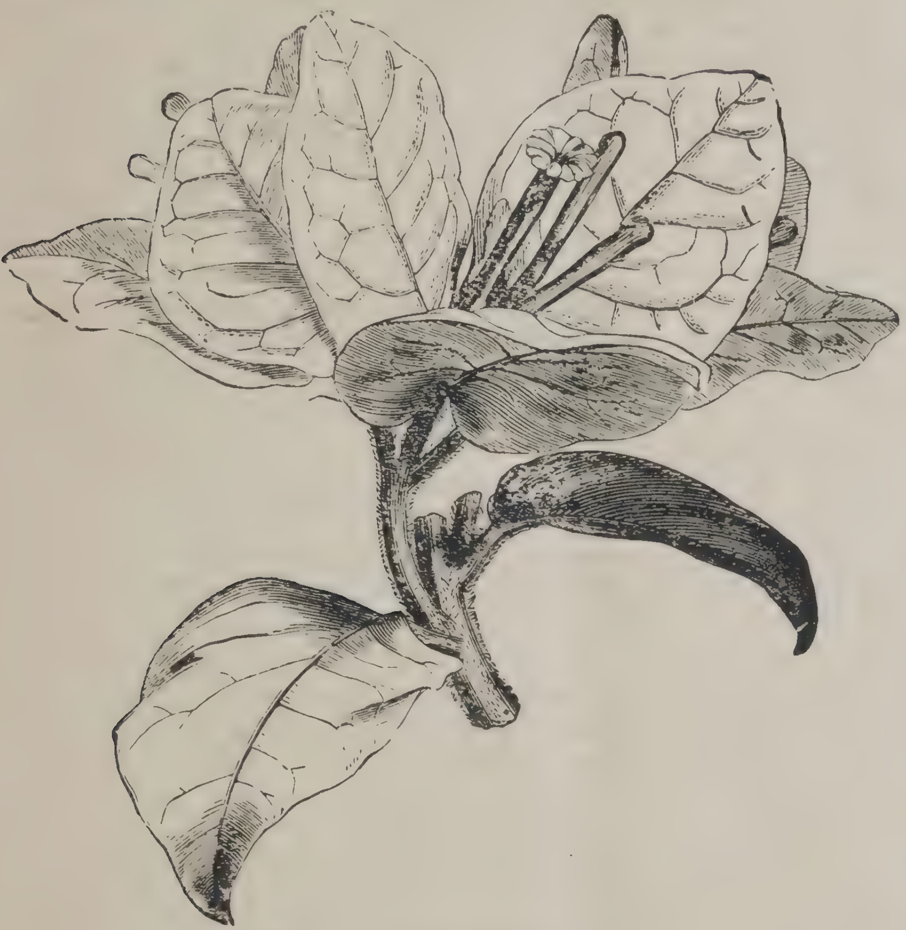


Fig. 2. BOUGAINVILLEA.
Showing three flowers surrounded by three bracts. The latter are brightly coloured in nature.
(From the *Dictionary of Gardening*)

Another example is furnished by the *Poinsettia* often seen in West Indian gardens in which the group of very small inconspicuous green flowers is surrounded by a number of flaring scarlet leaves.

Bougainvillea and *Poinsettia* are both common plants in the West Indies and form instructive examples for object lessons in schools.

FISHERIES AT BARBADOS.

In the *Colonial Report for Barbados*, 1901-02, (No. 368), his Excellency Sir F. M. Hodgson, K.C.M.G., writes thus concerning the Fisheries of the Colony:—

These are not unimportant and give employment to a comparatively large number of persons. But they are not in any way worked systematically or to the best advantage. Cured or salted fish is very largely consumed in Barbados, the quantity imported chiefly from Canada, exceeding £50,000 in value annually. It is worth while to ascertain whether, in the waters which encompass the island and which already yield to the present more or less primitive methods of catching the fish, such excellent fish as dolphin, snaper and flying fish, and a variety resembling white-bait, there are not also large fish which when caught could be salted and placed within the reach of the people at about half the price which they now have to pay for the imported fish. A proposal to obtain the report of an expert upon the sea fisheries of the island with a view to see what could be done in the matter was, to my great regret, not at the time favourably entertained, but I hope later that this decision will be reversed.

What is known as the 'sea egg' [the roe of a sea urchin] forms a staple food, but the takings in recent years have considerably diminished. In 1879 an Act was passed providing for a close season, but this Act, although it has certainly done good has not had the desired effect of altogether preventing a falling off in the supply. It is now considered that what is wanted is not so much a close season, although that is desirable, as the establishment of propagating areas of reserve grounds within which the gathering of sea-eggs would not be permitted. Here again the report of an expert would be useful, as he would be able to indicate the best areas for reserves and also to say whether the re-stocking of the selected grounds is necessary.

Whales are caught off the coast in small numbers and give employment to a few persons. The exports of oil have been as follows:—

Year.	*Barrels.*	*Value.* £
1899	254	423
1900	553	922
1901	583	972

COCOA-NUT PEARLS.

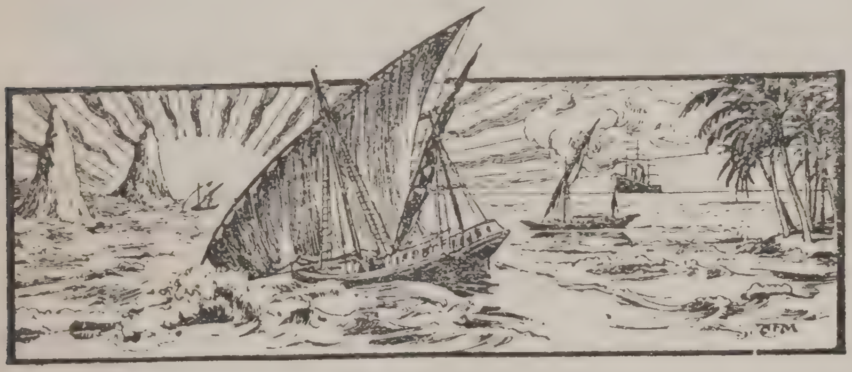
The following extract is taken from *Chemical Studies of the Cocoa-nut with some notes on the changes during germination.* By J. E. Kirkwood and William J. Gies, reprinted from the Bulletin of the Torrey Botanical Club, 1902, pp. 321-359 and issued as No. 26 of the Contributions from the New York Botanical Garden for June 1902:—

Within the nut there is occasionally found a small stony substance of a bluish white colour, a kind of vegetable bezoar, called in India *calappa*, which is eagerly purchased by the Chinese, who ascribe great virtues to it as a sort of amulet to preserve them from diseases. The cause of its formation in the nut is unknown.

According to Harley and Harley these pearls, like those of molluscan origin, appear to consist almost entirely of calcium carbonate, with water and organic matter in smaller proportion. Riedel, quoted by Harley and Harley, states that in 1886, while in North Celebes, he found a pearl in the endosperm of the cocoa-nut. One such pearl was pear-shaped in form and 28mm. long.

We are greatly indebted to Dr. D. Morris, C.M.G., Imperial Commissioner of Agriculture for the West Indies, for the following very interesting quotation from a letter to Dr. MacDougal:—

'More than two hundred years ago Rumph, an eminent botanist in the East, sent as a present to the Grand Duke of Tuscany a ring in which a cocoa-nut pearl had been set. Further, Rumph himself described cocoa-nut pearls in his great work with considerably minuteness and gave illustrations of two of them. One was perfectly round, the other was oval or egg-shaped. Travellers in the Philippine Islands have heard of cocoa-nut pearls, but seldom or ever have seen them. The natives, it is said, keep "cocoa-nut stones" as charms against disease and evil spirits. The Rajahs, we were told, highly prized them and wore them as precious stones. It was only a few years ago that real cocoa-nut pearls were at last brought to England. One is now at the Museum at the Royal Gardens at Kew, brought by Dr. Hickson. It is almost egg shaped, perfectly white, and composed almost entirely of carbonate of lime. It has, in fact, a somewhat similar composition to the pearl of the oyster, and yet there is little doubt it is a purely vegetable product.' (See Harley and Harley: *Proceedings of the Royal Society of London*, 43, 464. 1887-11).



GLEANINGS.

The United States Department of Agriculture are stated to be about to introduce the mangosteen into Porto Rico and Hawaii.

During the week ending November 20, 109,522 bales of cotton were imported into the United Kingdom. The total for the year, to that date, was 3,140,171 bales.

It has been arranged to hold an Agricultural Show at the St. Lucia Agricultural School on March 27, 1903. Prizes are offered for sugar, cacao, coffee, spices, honey, fruit, vegetables, etc. Special prizes, open to the boys of the Agricultural School only, are to be awarded for the produce of school plots.

Turtle are still caught about St. Kitt's. The eggs are not unfrequently found deposited in the sandy beaches, on the windward side of the island, opposite Basseterre.

Turtle shell is one of the exports of the Turks and Caicos Islands. Last year 120 lb., valued at £120, representing the catch of the people of these islands were shipped at Jamaica. The Bahama schooners carried off 899 lb. of shell, valued at £817.

The exports of sisal fibre from Turks and Caicos Islands last year amounted to 461,183 lb., valued at £6,551, being an increase of 11,701 lb. over the exports of the previous year. Of the quantity exported last year, 46,704 ℔., valued at £653 went to Halifax, and 414,479, ℔. valued at £5,898, to the United States.

Much useful work is recorded from Grenada in connexion with the visits of Mr. McNeil, the Agricultural Instructor, to peasant cultivators throughout the island. Altogether about 60 people were visited in September last. In most cases demonstration lessons in pruning and budding were given, and in some districts peasants are now said to be forking, pruning, and manuring their cacao orchards regularly.

An interesting feature at Montserrat in connexion with the work of the Imperial Department of Agriculture is the training of lads with the object of making them skilled agriculturists. So far the scheme has been thoroughly successful. The pupil gardeners, as they are called, take great interest in their duties, and one of them, Cyril Young, has shown special aptitude for budding. After a course of only three months' training he is reported to have successfully budded over 50 orange trees.

Mr. Osment, the newly appointed Agricultural Instructor at St. Vincent, has been actively engaged on Relief Work in connexion with the recent volcanic eruptions in that island. The distribution of relief to sufferers, and the supervising of gangs engaged on road-making in the new refugee settlements at Clare Valley and Camden Park, are among the numerous duties entrusted to this Officer. The land allotments to refugees in the districts above referred to are also under his care, and the people are said to have already made good progress in rearing ground provisions to meet immediate requirements.

As one result of the specimens sent from Barbados to the Toronto Exhibition, inquiry has been made with reference to Barbados manjak.

The exports of molascuit from British Guiana are stated to be increasing. The material is reported to be finding favour with cattle breeders in England, at prices ranging from £5 to £6 per ton.

A cupful of carbolic acid placed in a hot saucer or frying pan in the middle of a closed room for an hour or so is said to be an infallible method for clearing it of flies.

Ordinary bluestone is said to be one of the most effectual applications known for destroying the prickly pear. This plant often proves troublesome to stock farmers in these islands. It is found in Queensland that it is only necessary to powder the bluestone, cut a few slits in the leaves and insert a small quantity of bluestone in each slit. In about three days the plant will droop, gradually turn black and die. In three weeks or so it can be pulled up without difficulty.

The 'Wild cocoa-nut' (Cocos amara) or Palmiste palm of St. Lucia occurs in several places on the Leeward side of that island. It is especially abundant on dry and rocky hillsides near the sea shore in the neighbourhood of the Roseau Valley. The palm is gregarious, forming dense thickets in favourable situations. It is a near relative of the cocoa-nut palm the fruit being externally a minature cocoa-nut in every respect.

The export of salt from Turks and Caicos Islands in 1901 showed a decrease of 30,627 bushels as compared with the average exports of the previous five years. The exports in 1901 amounted to 1,726,245 bushels, valued at £23,491.

The December rains have greatly brightened the prospects of the sugar crop at Barbados. The old canes are much improved in appearance, and an excellent 'spring' of young canes has been obtained.

The second lecture to teachers on the manner and method of teaching agricultural science in elementary schools by means of object lessons, was delivered at the St. Philip's centre on December 27, by Dr. Longfield Smith. Sixteen teachers attended. At the close of the lecture several of the teachers expressed their interest in the course, and their desire to obtain the simple apparatus and inexpensive chemicals used in illustrating the lecture.

EDUCATIONAL.

School Gardens.

On page 285 of our last issue an account was given of a school garden in England, illustrated by a diagram showing the general arrangement of the plots and paths.

In the illustration below (Fig. 3) the mode of subdividing each of the larger plots is shown, and also the crop raised upon each division.

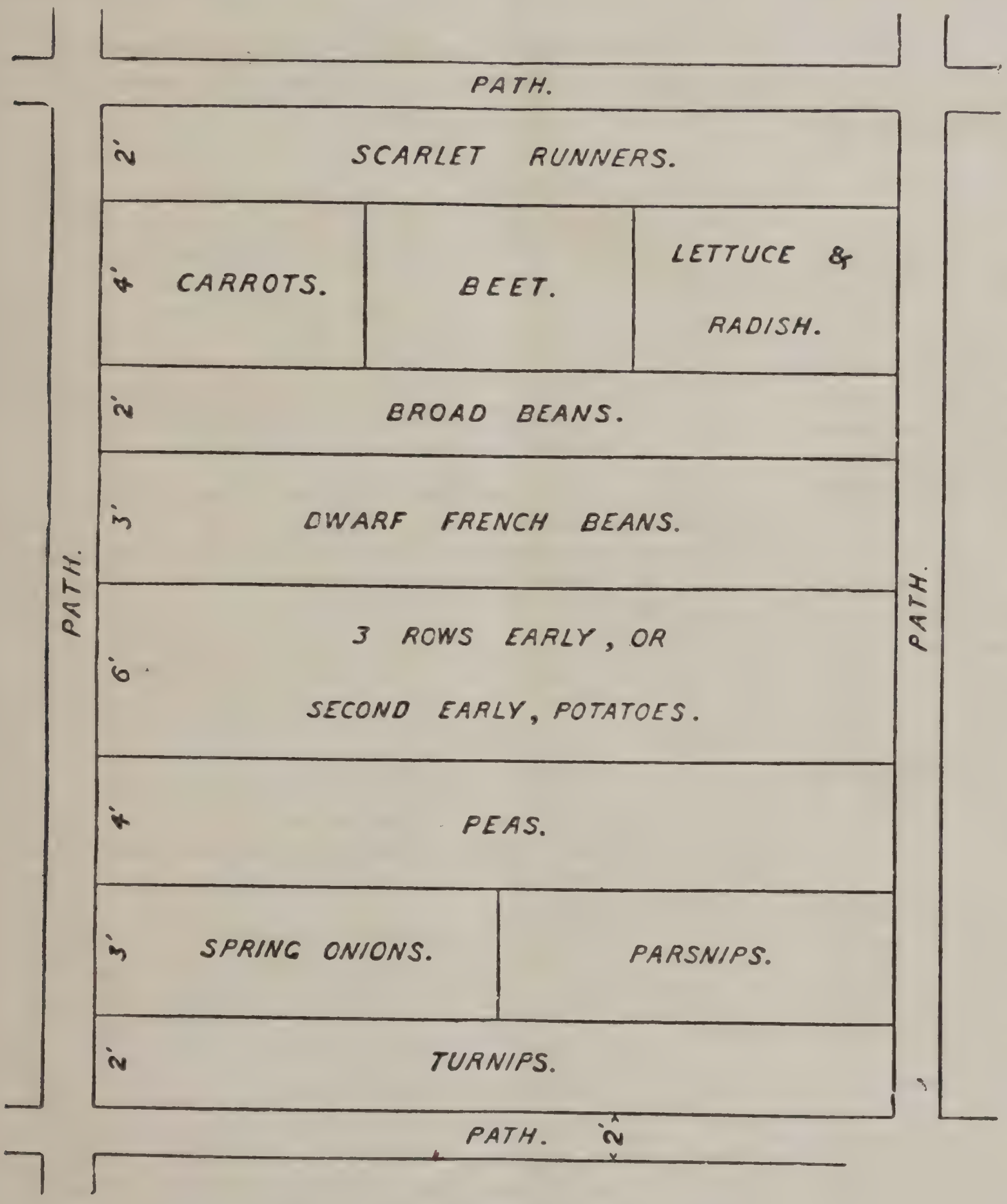


Fig. 3. Arrangement of Garden

Each plot in such a garden can be put under the charge of one or more pupils. Similar crops being grown on each plot, the results obtained can be readily compared.

By judicious arrangement the crops can be so ordered as to give the boys regular occupation during a large portion of the year. In these colonies, ochras, bonavist, egg plants, etc., should find a place instead of some of those vegetables such as English peas, which do not thrive in all parts of the West Indies.

The illustration is produced from the pamphlet of the English Board of Education, entitled *Specimen Cases of Object Lessons and Instruction in Gardening, in actual operation in Elementary Schools.*

School Garden Shows in Trinidad.

At a recent meeting of the Board of Education in Trinidad, Mr. J. H. Collens, the acting Inspector of Schools, brought forward a proposition, which was considered and agreed to, that in future the annual school garden exhibitions in that island shall be held in several country centres, to which the surrounding schools will be invited to send their exhibits. Hitherto the school garden exhibitions have been held at one centre in Port-of-Spain, but the results, consequent on the long distances many of the exhibits had to travel, the want of facilities for transport from a great number of gardens, together with other disadvantages are believed not calculated to promote a love of agriculture, or to encourage perseverance in its pursuit by the children of the elementary schools, any more than to induce the school masters to continue zealously and cheerfully to inculcate into their pupils the principles of agriculture.

The advantages of holding exhibitions simultaneously at different centres within easy reach of surrounding schools, can readily be understood and appreciated, and such shows must tend to encourage the children and promote a love for agricultural pursuits. Discussing Mr. Collens' proposal the *Port-of-Spain Gazette* writes:—

'Under the new proposal, however, we hope it would be possible easily to secure the presence of most of the children from all the surrounding schools to attend the exhibition, and the produce would be fresh, the natural conditions would be more nearly similar, ... and in every way the chances would be in favour of more successful shows. Another by no means inappreciable advantage is the interest which locally centred shows would have for the residents of the districts, and the lessons in agricultural possibilities which the general public would thereby gain. This cannot fail to be beneficial to the spread of agricultural education in the highest and most professional sense of the term, and that we regard as one of the surest hopes upon which to base the future prosperity in Trinidad.'

Rooting Cuttings.

Mr. J. Belling, the Science Master at the Grammar School at St. Kitt's, writes:—

An easy way of rooting cuttings is to fill a kerosene tin three quarters with sand. Place the cuttings round the edge of a flower pot filled with sand, and immerse the pot in the sand in the tin. This should be kept saturated with water. In this way the cuttings get both air and water, and are found to strike readily.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—December 9, 1902.—Messrs. J. Hales Caird & Co., and 'The Public Ledger,' December 6, 1902.

Aloes—Curaçoa, 14/6 to 40/-; Barbados 13/- to 35/- per cwt.

Arrowroot—St. Vincent, 3*d*. to $5\frac{3}{4}$*d*. per lb.

Balata—Demerara sheet, 2/- to 2/6 per lb.

Bees-wax—Jamaica, fair to good pale £7 5*s*. to £8 per cwt.

Cacao—T'dad, 59/- to 85/- per cwt. ; Dominica 52/6 to 59/- per cwt. ; Grenada, common to fine 56/- to 61/- per cwt. ; Jamaica, 55/6 to 63/6 per cwt.

Cardamoms—Mysore, 1/4 to 4/- per lb.

Coffee—Jamaica, 37/- to 125/- per cwt. Costa Rica, 42/- to 91/- per cwt. ; Peaberry 75/- to 115/- per cwt.

Cotton— West Indian $4\frac{3}{4}$ to $5\frac{5}{16}$*d*. per lb.

Fustic—£3 10*s*. to £4 5*s*. per ton. In moderate demand.

Ginger—Jamaica, common to fine 35/- to 50/- per cwt.

Honey—Jamaica 18/- to 23/- per cwt.

Kola Nuts—1*d*. to 4*d*. per lb.

Lime Juice—Raw, 9*d*. to 10*d*. per gallon ; Concentrated, £11 10*s*. per pipe.

Logwood—Jamaica, £4 2*s*. 6*d*. to £4 7*s*. 6*d*. per ton.

Mace—1/3 to 2/10 per ℔.

Nitrate of Soda— Agricultural £9 5*s*. per ton.

Nutmegs—90's to 60's @ 1/1 to 2/7, 132's to 95's @ 7*d*. to 1*s*. per lb.

Pimento—$2\frac{1}{4}$*d*. to $2\frac{3}{4}$*d*. per lb.

Rum—Demerara 9*d*. to $10\frac{1}{2}$*d*., Jamaica 1/8 to 7/- per proof gallon.

Sugar—Barbados Muscovado, 12/- to 13/- per cwt.
Jamaica Muscovado 10/3 to 13/6 per cwt.
Trinidad and Demerara 13/6 to 15/- per cwt. duty paid.

Sulphate of Ammonia—£11 13*s*. 9*d*. to £11 15*s*. per ton.

Tamarinds—Barbados 12/- to 15/6 per cwt.

Fruit—Covent Garden Market ('Gardeners' Chronicle,' December 6, 1902.)

Bananas—7/- to 12/- per bunch.

Oranges—13/- to 25/- per case.

Pines—3/- to 5/- each.

Halifax, N.S.—The 'Maritime Merchant,' November 20, 1902.

Molasses—Barbados 24c. to 35c. Porto Rico 31c. to 34c.

Oranges—Jamaica, $2.75 to $3.00 per box and $5.00 per barrel.

Sugars—Bright yellow, $3.7(; No. 1 yellow, $3.40.

New York,—November 28, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, 90c. to $1.00 ; six to eight hands, 45c. to 70c.

Cacao—African, $12\frac{3}{4}$c. to $13\frac{1}{4}$c. ; Caracas, $13\frac{3}{4}$c. to 18c. ; Jamaica, $11\frac{1}{2}$ to $11\frac{3}{4}$c., ; Grenada, $13\frac{1}{4}$c. to $13\frac{1}{2}$c. ; Trinidad 13c. to 14c. per lb.

Cocoa-nuts – Trinidads $16.00 to $18.00 ; Jamaicas $21.00 to $23.00 per M.

Coffee—Rio, good ordinary $5\frac{1}{8}$c. to $5\frac{1}{4}$c. ; Jamaica, fair to good ordinary $5\frac{3}{4}$c. to 6c. per lb. ; Manchester grades $8\frac{1}{2}$c. to $10\frac{1}{2}$c. per lb.

Grape Fruit—$4.00 to $7.00 per barrel.

Oranges—Jamaica, $4.25 to $4.75 per barrel.

Pimento—$4\frac{5}{8}$c. ex wharf, and $4\frac{3}{4}$c. per lb. ex store.

Rubber—Nicaragua scrap 55c. to 56c. per lb ; Guayaquil strip 53c. to 54c. per ℔ ; Esmeralda sausage 57c. to 58c. per lb.

Sugar—Muscovado, 89°, $3\frac{5}{16}$c. to $3\frac{3}{8}$c. per lb. ; Centrifugals, 96°, $3\frac{13}{16}$c. ; molasses, 89°, $3\frac{1}{16}$c. to $3\frac{1}{8}$c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—December 16, 1902.—Messrs. G. W. Bennett Bryson & Co., Ltd.

Molasses—Market closed.

Sugar—Market closed.

Barbados,—December 20, 1902.–Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb. Dull.

Cacao—$11.10 to $11.57 per 100 lb.

Coffee—Jamaica and ordinary Rio $8.00 to $9.50 per 100 lb. respectively.

Hay—New Brunswick 80c. to 90c. per 100 lb.

Manures—Nitrate of Soda $60.00 to $65.00 ; Ohlendorff's Dissolved Guano $60.00; Sulphate of Ammonia $80.00 to $85.00; Sulphate of Potash $67.00 per ton.

Molasses—No quotations.

Onions—Madeira $3.00 to $4.50 per 100 lb. Wanted

Potatos—$2.40 to $3.25 per 160 lb.

Rice—Ballam $4.35 to $4.50 per bag (190 ℔.) ; Patna $3.50 per (100 ℔.) ; Seeta $3.50 per (100 ℔.) ; Rangoon $2.25 to $300 per (100 lb.)

Sugar—$2.40 per 100 ℔.

British Guiana,—December 17, 1902.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $9.00 per barrel.

Balata—40c. to 42c. per lb.

Cacao—native 11c. to 13c. per lb.

Cassava Starch—$7.00 per barrel.

Cocoa-nuts—$8.00 to $10.00 per M.

Coffee—Rio and Jamaica $11\frac{1}{2}$c. to 12c. per lb. (retail.)
—Creole, 11c. to 12c. per lb.

Eddoes—$1.56 per barrel.

Onions—Retail $3\frac{1}{2}$c to 4c. ; Garlic 7c. to 8c. per lb.

Pea Nuts—Curaçoa 4c. ; American 5c. per lb. (retail.)

Plantains—20c. to 48c. per bunch.

Potatos English—$2.75 to $3.00 per barrel.

Rice—Ballam $4.75 to $4.80, ex store ; Patna and Seeta $5.75 to $6.00 per bag.
—Creole Rice $4.00 per bag.

Sweet Potatos—Barbados $1.80, Creole $1.44 per barrel.

Tannias—$1.68 per bag.

Yams—$2.40 per bag.

Molasses—Vacuum Pan, yellow, 15c. to 16c. per gallon, casks included.

Sugar—White $3.50 to $4.00; Dark Crystals $2.10 to $2.26\frac{1}{2}$; Yellow $2.10 to $2.25 ; Molasses $1.40 to $1.60 (nominal) per cwt.

Timber—Greenheart 32c. to 55c. per cubic foot.

Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—December 17, 1902.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co., December 18, 1902.

Cacao—Local, $12.75 to $13.60 ; Venezuelan, $13.50 to $13.90 per fanega.

Balata—Venezuelan 42c. to 43c. per ℔.

Coffee—Venezuelan. No quotation.

Onions—$2.50 to $3.50 per 100 lb. Garlic 35c. to 38c. per ℔.

Potatos English—$1.30 to $1.75 per 100 lb.

Rice—Yellow $4.50 to $4.70 ; White Table $5.00 to $5.75 per bag.

Sugar—For Grocery use, $1.75 to $3.50 per 100lb.

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The '**Agricultural News**' is printed in time to be distributed, regularly, by each mail, and is on sale by the local agents of the Department at one penny per number, post free, 1½*d.* The subscription price, including postage, is 1*s.* 7½*d.* per half-year, or 3*s.* 3*d.* per annum. *All applications for copies are to be addressed to the Agents, not to the Department.*

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[33.]

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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. II. No. 20. BARBADOS, JANUARY 17, 1903. PRICE 1*d*.

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Plant Breeding Conference.

THE International Conference on Plant Breeding and Hybridization held at New York on September 30 to October 2 last, was attended by 80 representatives from different parts of the United States, Canada, England, the West Indies, etc. A programme of more than 50 papers was presented, a number being sent from Germany, Holland, Austria-Hungary, France and England. All the papers are to be published in full in the *Proceedings of the New York Horticultural Society*, which it is hoped will appear early this year.

The representatives from the West Indies consisted of the Imperial Commissioner of Agriculture and the Hon'ble William Fawcett, Director of the Botanical Department at Jamaica. The Conference, from the agricultural point of view, was one of the most important and interesting that has been held for many years. A brief summary of the principal papers appears in the *Experiment Station Record*, Vol. xiv, No. 3, recently issued by the United States Department of Agriculture.

Professor W. Bateson, of the University of Cambridge, opened with a review of the Practical aspects of the new discoveries in Heredity. The author believed that the time would come when the fundamental principles of plant and animal breeding would be so well known that the breeder would be able closely to control his work instead of depending, as at present, upon chance results. This was the key note throughout the Conference. Mr. C. C. Hurst (England) stated it was essential that hybridists should select plant parents 'possessing characters which are at once single and constant, differential and dominant, and they must also take care to raise large numbers of individuals through many generations.' Mr. Max Leichtlin (Baden-Baden) offered practical suggestions for plant breeding. These we hope to reproduce shortly in these pages. Mr. W. M. Hays (Minnesota) believed that the value of plants and animals in the United States could be increased, by skilful breeding, to the extent of 10 per cent. at an expense of less than 1 per cent. The greatest financial gain would be secured by the improvement of only a score of plants and about four species of animals.

An interesting paper on the Correlation between different parts of the plant in form, colour, and other characteristics, read by Mr. S. A. Beach, indicated that by a proper study of the correlation of form, colour and vigour, undesirable material might be eliminated to a great degree while the seedlings were still young.

Dr. Morris read a paper on Cross Fertilization of the Sugar-cane describing the experiments going on in the West Indies in the permanent improvement of the sugar-cane. Specimens of cane B. 208 and a 'sport' from the Red-ribbon cane were exhibited. The Results of Hybridization and Plant Breeding in Canada was the title of a paper presented by Dr. William Saunders, Director of the Canadian Experiment Farms. This important communication embodied the results of 40 years' work in Canada in the production of new varieties of fruits and cereals. Specimens were exhibited showing the original and improved forms.

Mr. N. E. Hansen (Dakota) referring to the breeding of new varieties of fruits, stated that he proceeded on Darwin's theory that excess of food induces variation, and it was his belief that 'selection and cultivation were the chief factors to be considered in his region.'

Mr. T. V. Munson (Texas) claimed that the quality of grapes could be readily improved by selection and hybridization. Selection alone was too slow and new flavours and characteristics could be obtained only to a limited degree through bud variation. On the other hand, indiscriminate crossing without selection might prove injurious. Only when crossing is followed by careful and continuous selection are valuable results obtainable.

Mr. W. A. Orton (United States Department of Agriculture) read a paper on the breeding of disease-resisting varieties of cotton. As a result of continued selection of resistant varieties, it was stated that Sea Island cotton was now grown in regions which had been practically abandoned on account of the destruction caused by the 'Wilt' disease.*

Mr. Wm. Fawcett (Jamaica) gave a brief account of plant-breeding work conducted in that island. The investigations were connected with the improvement of the banana, pine-apple and mango. It was stated that the best varieties of Avocado pear could be budded with success.

This brief review sufficiently indicates the scope and importance of the subjects dealt with at this Conference. We are convinced that the Conference will have far-reaching effects as regards the future of these colonies. Already active steps are being taken to improve by selection and hybridization the yield and quality of the produce grown in the West Indies, also to produce varieties less susceptible to disease and likely to prove more remunerative to the planting community.

SUGAR INDUSTRY.

Gummosis of the Sugar-cane.

Gummosis is a fairly common disease of the sugar-cane and has been ascribed to a *Bacillus* which is said to bring about the fermentation of sucrose. (*Agricultural News*, Vol. I. 75).

The disease forms the subject of a paper in the *Sugar Journal* for November and December 1902 by Mr. R. Greig Smith, M. Sc. The following is condensed from this paper :—

Some specimens of diseased Rappoe cane were obtained and cultures were made by inoculating different culture media with drops of gum, which exude from the vessels when the stem is cut across. The best medium for the growth of the gum bacillus was found to be neutral cane juice gelatine. From the growth on this a bacterium was separated by repeated cultivation and inoculation of fresh plates.

The slime or gum formed by this bacterium when grown on the surface of neutral cane gelatine or agar has the same appearence and consistency as cane gum. Moreover, numerous chemical tests prove the identity of the two substances. Hence the author concludes that he has proved 'conclusively that the isolated bacterium is the direct cause of the gummosis of the plant.'

The bacterium was found to grow most luxuriantly in a very faintly acid medium, and in the presence of 0·5 per cent. of peptone. The most suitable temperature was found to be 30° C. (86° Fahr.) while at 37° C. the bacillus did not grow at all. This explains in part why the disease occurs more frequently in cold, wet seasons.

In cultures common salt was shown to have a distinctly poisonous action on the bacillus and the idea naturally suggested itself that salt might be used to check the gummosis of the cane.

It was found that in Fiji healthy crops of cane are grown on soil containing anything under one per cent. of common salt. The evidence as to the relative prevalence of gummosis on sea-coast and inland soils is conflicting, and next year the Colonial Sugar Refining Company intend to test the action of common salt upon perfectly drained land.

Cultivation of disease—resisting varieties of canes is recommended, one cane the 'Tanna' is known to have given sound canes on fields which had previously yielded badly diseased crops. The sugar-content of the 'Tanna' is however lower than that of some varieties which are liable to gummosis.

---

* A supply of seed of these resistant varieties of Sea Island cotton has lately been presented to the Imperial Department of Agriculture for the West Indies by the United States Department of Agriculture.

ENSILAGE IN GRENADA.

The following notes on the preservation of fodder by ensilage, in Grenada, are contributed by Mr. M. McNeill, the Agricultural Instructor:—

Preserving fodder by ensilage is practised on one estate in Grenada, Point Saline, at the extreme south-west end of the island. The estate is principally devoted to the breeding and rearing of horses, cattle, and sheep, as the climate is too dry, and the situation too exposed for the cultivation of the crops usually grown in the island, with the exception of corn, peas and similar plants. The pastures, which furnish abundant grazing in the wet season, present a brown, burnt-up appearance in the dry season, and unless a supply of food is forthcoming from another source, animals suffer considerably.

The system of siloing fodder practised hitherto here is simple in the extreme, but it may be mentioned that a covered silo is in course of construction. The silo was made by fixing a pole 20 to 25 feet high in the ground in a conveniently situated level field, and placing a circle of similar sized poles round about it. The outside poles were fixed in the ground far enough apart to allow a horse and cart to pass through when bringing in the grass. The diameter of the circle was 25 feet.

Stacking commenced about the beginning of September and was continued daily for a number of weeks until the stack attained to a height of about 25 feet.

Pressure was applied at first by allowing the horse and cart that brought in the fodder to pass over it. When it got too high for that method, a horse alone was used by fastening it to the centre pole and making it walk round. Later on when the stack got too high for a horse, kerosene boxes filled with salt were placed on the top. In the final stages the fodder was hoisted up by block and tackle fastened to an extra strong pole, and the whole stack finished off in the shape of a cone to throw off as much rain water as possible.

Barbados sour-grass (*Andropogon pertusus*) was the principal fodder used, along with a small proportion of native grass. There still remains part of a stack built in the latter part of 1901. The sour-grass from the inner part of the stack is of a straw colour, resembling hay in appearance, and is readily eaten by stock at the present time when other food is plentiful. The native grasses have decayed and are turning into dust.

The cost of cutting and collecting (cartage to the silo not included) the sour-grass averages about 12*s.* per acre. Sometimes it is allowed to lay in the sun for a day before stacking.

Sour-grass was introduced from Barbados by the owner of this estate about 12 years ago,—a small plant from a flower pot was planted out and established at Good Hope. Now a considerable area is planted with sour grass at Pointe Saline where it has made itself thoroughly at home. It is growing luxuriantly in light sandy soil by the sea shore, and seedlings are establishing themselves in small crevices in the face of the rocks along the coast, and also here and there on the hill sides.

An article on 'Silos on Sugar Estates in Barbados' by Mr. E. H Thorne, F.I.C., will be found in the *West Indian Bulletin*,, Vol. I, pp. 219-25. A copiously illustrated paper on 'Silo Construction' has recently appeared in the *Agricultural Gazette* of New South Wales, Vol. XIII, pages 959-75.

STORING SWEET POTATOS.

The sweet potato has, compared with the yam, low keeping power, and for this reason is often very abundant in the West Indian markets, whereas at other seasons of the year it is relatively scarce. In the *West Indian Bulletin*, Vol. II, pp. 206-11, a paper will be found giving the results of a large series of experiments carried out at the South Carolina Experiment Station, on manuring and storage of sweet potatos.

'For the purpose of determining the relative value of different methods of storing, roots of the Georgia Buck variety were stored in a covered building, in straw, sand, cotton-seed hulls and cotton seed, and in the ordinary way in piles covered with straw, cornstalks, dirt, and a shelter of boards. According to an analysis of a large composite sample, the roots on November 28, before storing, contained 75·35 per cent. of water, 13·13 per cent. of starch, 0·77 per cent. of glucose, and 4·31 per cent. of sucrose. The results of analysis after storing are given on page 210. The method of storing largely influenced the changes in composition. The best results were obtained with the use of cotton-seed hulls, dry sand, and cotton seed, in the order named. Storing in straw is not considered advisable.'

In the West Indies a good deal of work has been done in endeavouring to find an economic method of preparing a meal from the sweet potato. These experiments are fully described in the *West Indian Bulletin*, Vol. II, pp. 293-302.

At Anguilla, Dr. Numa Rat has taken a keen interest in the question and by the aid of machines imported by the Imperial Department of Agriculture, he has this year prepared the meal at a much cheaper rate than in the experiments recorded in the paper referred to in the preceding paragraph.

A sample of the meal prepared in Dr. Rat's latest experiments was forwarded to Prof. A. H. Church, F.R.S., who has kindly analysed it and reports as follows:—

'I send the results of an analysis of the last sample of sweet potato meal prepared in Anguilla. The figures are very near those obtained with the sample analysed in July 1900, but the "ether extract" and the "ash" are both higher, a good feature.

Sweet Potato Meal.

Anguilla.	Received October, 1902.
	per cent.
Water at 100° C.	12·9
Ether extract (oil, etc.) ...	1·1
Fibre	2·4
*Nitrogenous matter (N. = ·584)	3·7
Ash	2·4
Starch, sugar, gum, etc., by difference	77·5
	100·0

---

* Albuminoids coagulated by phenol-method ... 3·4 per cent.'

NOTES ON ESSENTIAL OILS.

The following notes are taken from Messrs. Schimmel & Co's. *Semi-annual Report* in continuation of those given on page 4:—

EUCALYPTUS OIL.

The Algerian distillers have again the upper hand in the distillate of the Globulus species, and they supply faultless quality at such a low price, that the Australian manufacturers have been compelled to withdraw their competition.

The demand has been confined within normal limits.

Covered fully for a long period by a large contract, we are in a position to maintain the present low quotations.

GINGER OIL.

The value of African ginger, which is the only kind coming under consideration for the distillation of the oil, has undergone a very considerable rise, owing to lack of sufficient supplies, and this advance has affected all other kinds of ginger. The prices of oil moved upwards in a corresponding degree. At the present time it would not be possible to renew our stock of oil at the price at which it is sold.

LEMONGRASS OIL.

The prices of this oil fluctuated during the last few months between 4½*d.* and 5½*d.* equal to 14·50 to 17 marks per kilo purchase price, but the article appears to be scarce in India, as large parcels were rarely offered. We hear from Cochin that the yield of the harvest has been very small, and that in consequence the merchants are holding the goods back in order to obtain higher prices.

The decline of the sugar industry in the West Indian islands appears to lead to this, that the lands and the labour set free by the reduced cultivation of sugar-cane are employed for other purposes; and from a report which has reached us from a friendly quarter it would seem that it is intended to take up there the cultivation of the *Andropogon* grasses. That attempts to cultivate these grasses have already been made in those islands is proved by the fact, that the Superintendent of the Botanical Gardens at Trinidad, at a meeting in Barbados, produced among other essential oils, also the oils of *Andropogon Nardus* var., and *Andropogon Schoenanthus*, which were subsequently examined more in detail at the Government Laboratory in Antigua.

The following results were obtained there :—

for the first oil :

$d\,\frac{155^\circ}{155} = 0{\cdot}9084$, $aD = +0^\circ 1'$; aldehyde-content 15·5 per cent. ;

saponification number 23, saponification number after acetylation 168·5, corresponding to a total alcohol-content of about 53 per cent. ;

for the other oil :

$d\,\frac{155^\circ}{155} = 0{\cdot}9315$, $aD = +3^\circ$; aldehyde-content 48·2 per cent. ;

saponification number 31·1; saponification number after acetylation 69·6, corresponding to 20·2 per cent. $C_{10}H_{18}O$.

Whereas the first of the two oils, apart from the low dextrogyration, approximately agrees with Ceylon citronella oil (it does not dissolve in 10 volumes of 70 per cent. alcohol, but readily in the same volume of 80 per cent. alcohol), the other oil differs in its properties in a very marked degree from palmarosa oil, with which, according to the mother plant, it should be identical. But the oil cannot be considered as lemongrass oil because (even assuming that the aldehyde it contains is actually citral), the aldehyde-content is too low ; it shows a certain amount of similarity with a lemongrass oil from the same district (compare Report April 1902, page 48,) inasmuch as it dissolves with great difficulty, and only makes clear solutions with 94 per cent. alcohol.

LIMETTE OIL.

We have just received a fresh consignment (and that of the hand-pressed sort) of the excellent product of the Montserrat Co., Ltd., which comes slightly lower in price. The quality is exceptionally good.

VETIVER OIL.

The consumption of this oil shows a large increase in recent times, probably due to the constantly growing taste for intense and durable perfumes. Such, in the true sense of the word, is our distillate, especially if it is compared with regard to its richness, with the imported commercial oils from Réunion and the East Indies.

COFFEE IN TRINIDAD.

Mr. J. H. Hart contributes the following interesting notes on some of the varieties of coffee grown at the Experiment Station, Trinidad:—

CONGO COFFEE. (*Coffea robusta*).

Trees of this new coffee planted at the Experiment Station, St. Clair, have grown rapidly, and maintained excellent health during the past year. They are now bearing their second crop of berries, and the third show of flowers has just commenced to appear. This season there is a fine crop upon the trees, which will apparently be much later in ripening than other species of coffee. The clusters of berries are in whorls, many of them forming a circular ball completely round the branch. The name *robusta* appears to be fully justified by the luxuriant growth which it makes, and there is every indication of its becoming a most useful coffee for low elevations. It is reputed to have a very fine flavour, and the crop now ripening will enable us to speak more definitely on this point in a few weeks time.

HYBRID COFFEE.

The numerous plants of hybrid origin raised from seed of the West African *Coffea stenophylla*, grown in proximity to a clump of Liberian coffee, are now fruiting for the second time, and fully maintain the characters which appeared last year. They promise to give a strain of coffee possessing strong vitality, and will probably be found suitable for cultivation where the Arabian varieties refuse to thrive.

So far there is no appearance of leaf disease of any kind upon them. Happily the virulent *Hemileia*, has not as yet found footing with us as a West Indian pest; but the Arabian varieties suffer at times, though not severely, from the attack of *Cercospora coffeeicola*. Even from this disease, up to the present, both the hybrid varieties and *Coffea robusta* have been exempt.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Markets.

The following notes on the sales of December have been contributed by Mr. J. R. Jackson, A.L.S. His last article will be found in Vol. 1, p. 275:—

Writing these notes early in December and comparing the market reports on drugs and such allied products as spices and condiments for the past month, indications are not wanting of the approach of the Christmas season. Spices and condiments naturally attract more attention as Christmas draws near, than products that are exclusively of pharmaceutical application, besides which, even in the drug show rooms, samples that can in no way be considered as drugs but are veritable articles of food, such for instance, as dried Russian ox tongues, occasionally find a place in some remote corner. As we are concerned, however, only with vegetable products, we pass these over to consider first the month's dealings in spices.

PIMENTO.

With regard to the position of pimento, the sales at the beginning of November were slow, and a few lots were sold at the following prices:—Common $2\frac{1}{4}$*d.* per ℔., ordinary $2\frac{3}{8}$*d.*, fair stalky $2\frac{1}{2}$*d.*, and good clean $2\frac{9}{16}$*d.* At the end of the month the prices slightly decreased, but would probably show an upward tendency at the early December markets.

MACE.

Mace began with advanced prices early in November, good bold Penang being sold at 2*s.* 10*d.* per ℔., and fair West Indian at 1*s.* 5*d.* to 1*s.* 6*d.*, while ordinary brownish Bombay, wild, was bought in at 3*d.* As the month advanced the price for bold Penang had increased to 3*s*, while middling red sold at 1*s.* 8*d.*

CLOVES.

Zanzibar cloves, at the beginning of the month, were reported rather dearer owing to the new crop coming in slowly, $4\frac{5}{16}$*d.* per ℔. being paid for January to March delivery. Ordinary Penang were held for $6\frac{1}{2}$*d.*, and good Amboyna for $5\frac{3}{4}$*d.* As the month advanced the prices for bold Penang had increased to 3*s.*, while middling red sold at 1*s.* 8*d.*, and good dark to good bright were bought in at 7*d.* to 8*d.*, Amboyna and Zanzibar remaining as above.

In connexion with these prices it may be of some interest to give the retail prices from the current price list of the Civil Service Stores where pimento or allspice, whole, is quoted at 6*d.* per lb., and ground at $6\frac{1}{2}$*d.*; finest Penang cloves 1*s.* 2*d.* per lb., second quality 10*d.*; finest ginger 1*s.*, second quality 9*d.*; mace, (only one quality given) 3*s.* 4*d.* per ℔.

ARROWROOT.

The following quotations for each week in November will show the position of arrowroot throughout the month. First week the parcels of St. Vincent offered were all bought in, while Bermuda sold at 1*s.* 5*d.* per lb. In the second week fine St. Vincent in tins was again bought in at 6*d.* In the third week good St. Vincent in tins sold at 4*d.*, while the parcels in barrels were bought in at $3\frac{5}{8}$*d.* For the fourth week good St. Vincent in tins was bought in at $4\frac{3}{8}$*d.*, and fair to good in barrels at $3\frac{3}{8}$*d.* to $4\frac{1}{4}$*d.* So that it will be seen that the arrowroot market has been uneventful.

VANILLA.

At the first vanilla auction in November over 1,200 tins were brought forward, and practically all were sold with a good demand, medium to fine quality being from 1*s.* to 3*s.* per ℔. dearer, and common and foxy 6*d.* cheaper. The bulk consisted of Seychelles and sold as follows:— Fine chocolate 8 to $8\frac{1}{2}$ in. 25*s.* to 25*s.* 6*d.*, $7\frac{1}{2}$ to 8 in. 21*s.* to 22*s.* 6*d.*, 7 to $7\frac{1}{2}$ in. 17*s.* to 18*s.* 6*d.*, $6\frac{1}{2}$ to 7 in. 14*s.* to 16*s.*, 6 to $6\frac{1}{2}$ in. 12*s.* to 13*s.* 6*d.*, 5 to 6 in. 10*s.* 6*d.* to 11*s.* 6*d.* per ℔. Fair to good short fetched 5*s.* to 7*s.* 6*d.*, medium 7*s.* to 11*s.*, long 11*s.* to 19*s.* 6*d.*, and common brown and foxy 3*s.* 6*d.* to 12*s.* 6*d.* per ℔.

The only other articles of West Indian production calling for note are the following:—

KOLA, BAY OIL, SARSAPARILLA.

Kola: Some samples 'rather mouldy and dull' realized 3*d.* to $3\frac{1}{4}$*d.* per ℔. at the latest November sale, while at the mid-monthly sale, a bag of 'mouldy and damaged' Ceylon realized only $1\frac{1}{2}$*d.* At this same sale two tins of distilled Oil of Bay catalogued as 'direct from Montserrat' sold at 5*s.* 6*d.* per ℔., while a sample of native Jamaica Sarsaparilla, very mixed, grey and red damaged, was sold at $7\frac{1}{2}$*d.* per ℔. At the end of the month five bales of native red Jamaica sold at 8*d.* to $8\frac{1}{2}$*d.*, and 6*d.* per ℔. for mixed greyish.

Sea Cocoa-nuts. Amongst the many curiosities cast up on the shores of the West Indian islands by the sea are numbers of brown, globular fruits, with a hard rind or shell, about the size of a hen's egg. These are popularly known as 'sea cocoa-nuts.' In reality they are fruits of the Timite palm (*Manicaria saccifera*, Mart.) which grows abundantly in the swampy lower districts of Trinidad and along the river banks of the South American mainland. The tree produces large quantities of seed, which falling into the water are borne by ocean currents to the shores of the West Indies. Dr. Morris in his article on 'A Jamaica Drift Fruit' thus refers to this sea waif:—

> 'In the West Indies the ripe fruits of a palm unknown in the greater Antilles are continually brought up by the Gulf Stream from the South and washed ashore at Jamaica and other places. They are locally called [in Jamaica] sea-apples or sea cocoa-nuts. They are the fruits of the 'Bussu Palm.' The white kernel is sometimes fresh enough to be eaten after long immersion in salt water. The fruit was gathered by Sloane as long ago as 1687, and he remarked that it was frequently cast on the North-west islands of Scotland by currents in the sea.'

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 31 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. II. SATURDAY, JANUARY 17, 1903. No. 20.

NOTES AND COMMENTS.

Citrate of Lime.

The citrate of lime made during the demonstration in Dominica (see *Agricultural News*, Vol. I, p. 99) was sold in London at the current rate for concentrated juice, namely, £12 5*s.* 0*d.* per pipe.

The London analysis showed 68·90 per cent. of citric acid, and the price realized was £2 4*s.* 0*d.* per cwt. From this the usual discounts and charges have to be deducted.

No comments were made by the brokers, from which it may be assumed that the sample was satisfactory.

◆

Experiment Station, Montserrat.

As a result of his recent inspection, the Commissioner of Agriculture for the West Indies reported with regard to the Grove Station, Montserrat, as follows:—

'With the valuable aid and the personal interest of his Honour the Commissioner, I am glad to place on record that this Station has steadily improved in attractiveness and usefulness, and I regard it now as assuming a form that will render it not only an ornament to the island, but an institution of great usefulness to all classes of the community.'

Jamaica Ginger.

The article on page 25 of this number, read in conjunction with the notes on the comparative market value of Jamaica and Cochin ginger on page 227 of Vol. I of the *Agricultural News*, furnishes another instance of the necessity of careful attention to grading West Indian products.

It has long been known that Jamaica ginger is of excellent quality, yet we find it in the English market fetching a much lower price than Cochin ginger. Careful inquiry on the part of Mr. John R. Jackson shows that Cochin ginger is actually of less value than Jamaica ginger, but that its higher price is due to the fact that it is carefully graded before coming into the market. The result is that buyers are aware they can depend on Cochin ginger to be what the marks indicate, and naturally prefer to purchase an article of known quality.

The lesson for Jamaica ginger shippers is obvious. If they wish to place their product at the head of the market they must give that careful attention to sorting and grading which the Cochin exporter evidently does. Thus and thus only, as we have so often pointed out with regard to other products, can they hope to secure the confidence of the market, and obtain the best prices for their produce.

◆

Bark Disease of Cacao.

The following quotation from page 98 of Porter's *Tropical Agriculturist*, published in 1833, serves to indicate that some of the bark diseases of cacao of the present day are perhaps of long standing and have not recently appeared for the first time in the West Indies:

'Cacao trees are likewise subject to a disease which shows itself in the form of black spots, or blotches, on the bark, and which as soon as they appear, should be carefully cut out, or the trees will quickly die. This disease does not make its appearance until the trees are in a bearing state.'

◆

Trinidad Mangos in Africa.

In the *Trinidad Bulletin* for October, the following paragraph is quoted from the *Annual Colonial Report* on Southern Nigeria for 1900:—

'Fifty mango plants (including No. 11 Peach, Mistake, Gordon, Malda, and Peters) were imported from Trinidad, and of these thirty-six have grown.'—(72 per cent.)

Commenting on this Mr. J. H. Hart says:—It is very satisfactory to receive news of the transport of plants to such a long distance with so small a loss. They were sent from the Trinidad Gardens by Government orders *via* Kew. The secret of all success in the transport of plants, is, as in this case, to *send away none but well established plants*. Plants taken up and potted a few days beforehand are useless, and loss is sure to occur even when forwarding short distances only.

Sweet Potatos from Barbados.

The following interesting note on the possibility of the sweet potato forming a substitute for the ordinary potato in the British Isles in times of scarcity is taken from the December number of the *Journal of the Society of Arts*:—

The wet summer that has been generally experienced throughout the British Isles has unfortunately been the cause of much anxiety among potato growers and consumers in arousing fears of short crops, inferior quality, and the prevalence of disease. Recent statements, however, have shown that the crop has not been so bad as was anticipated, though the quality is not a high one, owing to the prevalence of disease. Fortunately for Ireland, the crops are stated to be one of the most bounteous ever harvested, and that further, there is little indication of disease.

The potato being an almost indispensable article of food, it is satisfactory that we have not to depend alone upon the produce of the United Kingdom for our supplies, for we can draw very large quantities not only from France, Belgium, Holland, and Germany, but also from the Argentine and other places.

At periods of great scarcity in the potato supply, attention has frequently been directed to possible substitutes, but many of these have had but little to recommend them, besides which there is always much difficulty in inducing people to overcome prejudice against new products, especially in articles of food, without there is absolute compulsion. There is, however, a tuber closely allied botanically to the common potato, which though it is not unfrequently seen in the shops of most large towns, is comparatively unknown in ordinary households, but which might probably become an article of considerable import into this country from many of our colonies, were more attention drawn to it. This is the sweet potato, experimental shipments of which have been made in the early part of this year from the West Indies, the results of which were recently discussed at a meeting in Barbados, and reported in the *Agricultural News*.

American Sugar Market.

The *Maritime Merchant* for November 20, in the course of an interesting article discussing the effect on the sugar trade of the removal of bounties says:—

'Another fact that must be taken into consideration is the changed footing on which German beet root will enter the American market. Hitherto it has paid a countervailing duty of 28 cents a hundredweight. Hereafter it will be able to go in on a level with West Indian and other sugars on which no bounty is paid by the country of export. This should aid the German producers in enlarging their foreign business.'

Surra Disease in Horses.

A short note drawing attention to an emergency report issued by the United States Department of Agriculture on the occurrence of the Surra disease in the Philippines and the possibility of its introduction by means of returned army horses into the United States appeared in the *Agricultural News*, Vol. I, p. 134. Another note appeared on p. 146 giving indications of the character of the disease and the symptoms that accompany it. A further note announcing that surra was probably identical with the deadly tsetse-fly disease of Africa appeared on page 182. As the result of careful inquiry made at Washington by the Imperial Department of Agriculture it is authoritatively stated that no case of surra or tsetse has occurred in the United States. As the period of incubation has now elapsed, it is recommended that the restrictions hitherto in force in the West Indies against the importation of horses from the United States may, for the present, be removed. It will, however, be necessary to keep a watchful eye on all importations of horses into these Colonies as surra or tsetse may have been introduced into Mexico and other countries to which army horses, refused admittance in the United States, may have been shipped.

Dutch West India Colonies.

Prof. F. A. F. C. Went of the University of Utrecht and formerly in charge of Sugar-cane Experiments in Java, who was recently on a visit to the Dutch West Indies to report on their condition and prospects has issued two reports relating to these colonies. He describes also the results of his tour of the British West Indies. Further reports will soon be issued, dealing with the cultivation of the sugar-cane in the West Indies and the diseases of cacao in Surinam. As a result of his tour Dr. Went has recommended the formation of an Agricultural Department in the Dutch colonies somewhat similar to the Imperial Department of Agriculture for the West Indies, but on a smaller scale. A Director, a botanist, is to be placed at the head, and he will have charge of Experiment Stations with a laboratory at Paramaribo. A Superintendent will be stationed in the island of Curaçao where an Experiment Station is proposed to be started.

The sanction of the Dutch Government has been obtained, and Dr. Went hopes the Department will be able to commence operations during 1903. Dr. Went's reports have a considerable interest, in that they deal fully with the resources of the Dutch West India colonies and the best methods of improving their agricultural and general condition. The further report on the sugar-cane industry in the West Indies is likely to be of value as Dr. Went's experience in Java and his great knowledge of sugar-cane diseases specially fit him to discuss the subject. The 'Witch broom' disease of cacao in Surinam will also be fully discussed.

Barbados Local Exhibition.

A local Agricultural Exhibition was held at Todds' Estate, St. John, on the 13th. instant, and, in spite of adverse weather was an unqualified success.

We hope to give a full account of the Exhibition in our next issue.

INSECT NOTES.

The British Guiana Maribunta.

Notes on the Maribuntas found in some of the West Indian islands, namely, Grenada, Barbados and Dominica, were published in a previous number of the *Agricultural News.* (Vol. I, p. 200). These are now supplemented by the following brief description of the species found in British Guiana, kindly contributed by Mr. J. T. Thorne :—

There are three kinds in British Guiana. The dark yellow that builds under shelter, such as the eaves and gables of houses, etc., and makes a nest like honey comb; the black that builds in trees and makes a long cylindrical paper nest; and the small dark ones that also build in low trees and make a round paper nest. It is the 'mason bee' that uses such a large number of caterpillars. They build mud nests inside houses on ceilings, books, picture frames, and on anything else that wickedness can devise. The yellow Maribunta is probably the same as the wild bee of Barbados and the 'jack spaniard' of St. Vincent. The sting produces slight fever. The sting of the large black one or 'Quacco' gives severe fever for many hours.

It is evident that there is a considerable amount of variation in the nomenclature of the bees, wasps and allied insects of these islands. Thus the 'wild bee' and 'cow bee' of Barbados are distinct species from those of Dominica and probably also of St. Vincent. The 'mason bee' of Barbados never fills its nest with caterpillars, whilst one mason wasp brings in spiders and another brings in caterpillars. Many species of these insects occur throughout the West Indies, known collectively under such names as mason bee, cow bee, wild bee, jack spaniard, maribunta, or marabunta etc. Closer observation reveals that even in one locality more than one species is confused under each name, and in the different places quite distinct species with different habits bear the same popular names. Notes and specimens of these insects would be of value.

Treatment of Screw Worm.

The following notes on a method successfully employed on an estate in Jamaica, to rid cattle of screw worm are taken from the paper by the Hon'ble P. C. Cork, 'Stock rearing in Jamaica.' The paper which contains much other interesting information on allied subjects will be found in the *West Indian Bulletin*, Vol. II, pp. 203-06.

The *West Indian Bulletin* may be obtained from all agents of the Department, price 6*d.* per number. For fuller details on screw worm see the Department pamphlet *Screw worm at St. Lucia*, to be obtained from all Agents, price 2*d.*

MODE OF TREATMENT.

For the screw worm nothing was used but Jeyes' fluid applied with a small brush which could be got within the orifice of any sore. A regular system for everything had however to be enforced. All saleable cattle were gradually got rid of and the money used to purchase heifers and bulls; every cow's udder was carefully examined and those which had got injured detected, the cows being fattened for the butcher instead of being permitted to breed. A pasture near the dwelling house was set aside as a 'dropping pasture' or lying-in hospital, and another as a paddock for the sick. The animals in these pastures had to be attended to every morning. Any calf born since the previous morning was dressed with Jeyes' to prevent flies from coming near their navel, and the mother's udder had to be tested to see that the milk flowed freely, and this process was repeated every two or three days until all danger of attack from the screw worm had passed and the calf was feeding heartily. This work hardly ever occupied more than an hour of the time of a man and a boy, and after that one of the herds such as the breeding cows, the young heifers, or the young steers, would be driven in and carefully examined (each herd once a week). Any cow observed to be near the time for calving would be separated and put into the dropping pasture, and any animal showing cuts, bruises, etc., dressed with a strong solution of blue vitriol, or if screw worm had made its appearance the worm was killed with Jeyes' fluid, the wound washed with soap and water and a second application of the fluid made before the animal was allowed to leave the pen.

SUCCESSFUL RESULTS OF TREATMENT.

In the first complete year after this system had been got into thorough working order, ninety-seven calves were born, one of which died from a lightning stroke, one from cramp, having been born in the midst of a torrential downpour of rain while the overseer was absent from the property, and one from insufficient nourishment, its mother being one of those with a damaged udder which had been weeded out of the breeding herd but had jumped the stone wall and taken the bull before it was discovered. Ninety-four of these calves lived, and, had the overseer been present at the time, the one which died of cramp should have been saved by the application of warmth; while that which died of insufficient nourishment should have been separated from its mother and given into the care of a cow having sufficient milk to rear two calves. I was, however, not aware that this calf was being neglected. The stock on the 'pen' were speedily increased to 450 in number.

The moral of this tale is, that it does not require any very scientific treatment to circumvent the screw worm or the tick, but a good system thoroughly carried out is essential, and when once established it is surprising how much labour and trouble it saves the herdsmen who find their sick cattle reduced to a minimum, no sores on their calves, and the udders of their cows yielding milk freely.

The Sola Pith Plant. An interesting summary of information regarding the sola pith plant is given in No. 6 of the *Agricultural Ledger* for 1902. The most important economic use of the plant is in the manufacture of hats for tropical wear,—'sola-topis,' or as they are often incorrectly termed, 'solar-topis.' The so-called pith is in reality the wood of the plant; so great is its resistance to the sun's rays that the sola topi is 'superior to hats made of felt, cork or any other known material in the hat trade.' The sola plant (*Aeschynomene aspera)* is an 'aquatic,' and is found on land annually inundated, or on the margins of tanks, or lakes throughout Bengal, Assam, etc. The manufacture of the hats demands very skilful work, and is in the hands of certain castes.

GINGER.

JAMAICA VERSUS COCHIN GINGER.

In the course of the notes on 'West Indian Products' in the *Agricultural News*, Vol. I., page 227, contributed by Mr. John R. Jackson, A.L.S., the comparative prices of Jamaica and Cochin ginger are quoted. For the month then under review Jamaica ginger ranged from 37*s*. 6*d*. to 46*s*., whereas Cochin ginger was sold at from 35*s*. to 82*s*. 6*d*.

Mr. Jackson was consulted as to the cause for the comparatively low price of Jamaica ginger, and he has kindly inquired carefully into the matter and furnished the following notes:—

In the matter of ginger the markets fluctuated but very little throughout December. Jamaica, at the mid-month's sale was quoted as follows.–Middling washed 40*s*. to 42*s*. per cwt., and ordinary dull 36*s*. 6*d*. to 38*s*., which prices remained firm. On the other hand, at the same sales Cochin realized for dull, washed rough 35*s*. 6*d*., while bold and medium native cut was bought in at 85*s*., and medium and small at 60*s*. These prices also remained steady at the end of the month. As an explanation may be necessary to define the cause of the difference in prices between Jamaica and Cochin ginger, as well as to make the trade terms more explicit, I communicated with the Spice Specialist of one of the leading trade Journals, who has kindly given me the following information.–Jamaica is of more intrinsic value than Cochin but does not necessarily fetch a higher price; probably for the following reasons.–Should the supply of Jamaica be large and that of Cochin small, Cochin would bring a higher price than Jamaica, and *vice versa.* Jamaica is of unequal quality. For example, at auction each barrel is sampled and shown, but Cochin is of more equal quality and at auction an average sample only is exhibited as representing the bulk. When there is a speculative movement therefore, the run is on Cochin, as these are well-known standards. Cochin is prepared by Europeans or natives, and when done by Europeans the grades are as follows.–Cut, or bold cut, medium cut, small cut, rough or small rough, and cuttings. These grades are fairly even for each season, that is, 'cut or bold cut' of one parcel is equal to the same grade of another parcel. Different seasons, however, would differ slightly according to weather, etc. The native cut grades are not so reliable; they generally come as follows.–Bold and medium cut, namely, bold and medium cuts mixed together; medium and small cut, namely, the two mixed; and small cut, and cut ends.

Sometimes, however, all these qualities are mixed together and are then called unassorted native cut; and besides these, there is a variety of partly cut and scraped. The term 'brownish' may refer to a sample that has a little of the cuticle remaining, or to an old parcel that has got somewhat dull in appearance.

As a rule Jamaica is sent here on consignment and offered at auction on account of the importers, and is generally sold should there be good competition. Jamaica varies considerably in quality, some being very lean and dark and only fit for grinding, while some lots are very fine, bold, plump, well scraped and bleached, with a great variety between; but there is very little or no attempt to size it, the barrels containing pieces of all sorts and sizes. The common qualities fetch of course a low price, but fine lots bring high prices. Size for size, and appearance for appearance, Jamaica will bring more than Cochin.

SALE OF HONEY IN THE AMERICAN MARKET.

In the *Agricultural News*, Vol. I., page 229, a letter was printed from Messrs. Gillespie Bros. & Co., of New York, relative to the sale of honey in the American Market. Mr. G. S. Hudson, Agricultural Instructor, St. Lucia, to whom the letter was addressed, in forwarding it to this journal for publication, drew attention to the exceptional character of some of the figures. His remarks will be found on the page quoted. The following letter has since been received from Messrs. Gillespie Bros. & Co:—

We regret very much that our omission to correct certain errors in our letters to Mr. Hudson, September 24 and 30, 1902, led to their inclusion in the *Agricultural News*, November 8, 1902, p 229. First, the quotation 41c. to 43c per gallon should read *in bond* and not duty paid, and is respect of Comb honey, the reported sale was at 55 cents per gallon of 12 sections (12 lb.) duty paid: (rather dark quality). Since the dates mentioned, our market has advanced to 65 cents to 66 cents per gallon, duty paid, and 45 cents to 45½ cents per gallon in bond, for extracted Jamaica. Comb honey, in neat sections, may be quoted at 9 cents to 11 cents per 1 lb. section, duty paid; in this connexion our quotation is comparative only, as no West Indian comb honey has, to our knowledge, been offered here for some time, and our figures refer to clear bright honey. Honey in cases of two tins each is meeting with an increased demand at about 6 cents per lb., when offered in screw top tins; in this package it is taken readily by the domestic trade. A strong objection, however, is made to tins which are soldered and require extra labour in opening and closing, the latter processes involving unnecessary expense to the grocer and being, besides, unattractive. Screw top tins, we think, may be contained advantageously by nailing a wide strip (before covering the box) over the tops of the tins, from the ends of the box. This should steady the tins and prevent leakage. For honey in flat top tins from 67 cents to 68 cents per gallon is obtainable in a small way. Case honey being sold invariably to the home trade, our quotations are duty paid. Screw top tins may be obtained in this market for export at 20c. each, and flat top tins at 19½c., in lots of say 500 each.

Although Mexican and Cuban honey should soon come forward freely, we think the present level of prices will be maintained. For your guidance we enclose a pro forma account sale made up on to-day's quotations.

Pink Coralita. The Pink Coralita *(Antigonon leptopus)* is a well-known climber in West Indian gardens where it is much appreciated for its sprays of delicate rose-pink flowers. It may not be generally known that there is a white variety also of this charming plant. We recently saw it at Antigua. It has also been introduced from India into Montserrat. Seeds are being distributed to several of the Botanic Stations in these islands. This white form of the Pink Coralita is a distinctly interesting plant and worthy of more extended cultivation.

POULTRY.

This article concludes the present series of Mr. J. Barclay's notes, written especially for this journal:—

HATCHING AND REARING OF CHICKENS.

Eggs will be found to hatch best between the months of December and April, for as hens as a rule moult about the end of the year, they start to lay about December and the eggs are strongest then and the weather is also coolest. Between the twentieth and twenty-first day, the chickens will hatch. Leave them alone for twenty-four hours, and do not trouble them with food. Just before they are hatched they draw up all the yolk remaining in the shell with their bodies, and so are well served for food until they gain strength for a day. When the hen steps off and begins to look for food for the chicks, then it is time to begin feeding.

THE BEST FOOD FOR CHICKENS.

Coarse oatmeal is the best food for young chicks, but as it is an imported and expensive food, we must try and find something else. The brown coolie-rice (as it is called in Jamaica) is better than the white imported rice, as this brown rice contains more protein or the flesh forming element: at any rate, there is a noticeable difference in the chicks when fed on brown rather than white rice. This rice can be grown anywhere in the same manner as corn. In dry lands Guinea corn can be grown and used. From the first day the wood-ants or termites whose nests are so common at the roots of trees make splendid food for chicks. If any of the eggs are not hatched you must open these, carefully holding the egg away from you and chipping off a piece of the shell. If you find the contents clear and fresh, the egg has been infertile; if it is smelling badly, it is rotten and has had the embryo of a chick, which has not been developed, either through getting a chill, or having been laid by a sick hen, or having been shaken, or having been too old. It is well to know this, as few understand the difference between a fertile and infertile egg. Bury the rotten eggs at the foot of a fruit tree and put some stones on top to prevent dogs scraping them out. The infertile, clear eggs, may be boiled very hard, crumbled up fine and fed to the chicks as the first food they get. You may also turn over fresh ground and let the chicks find worms. With the brown rice, duck-ants, and worms, and cool clean water put in little dishes like sardine tins, the chicks will do for the first week. Then the more expensive rice may be superseded by Guinea corn, finely-ground maize and peas, and household scraps; but no large hard food like whole corn or peas should be fed until the chicks are two months old, and then only sparingly, or your chick will get crop-bound, sicken and die. If the corn and peas are ground very small, then they may be fed after the first week.

SAFEST WAY TO REAR CHICKENS.

The safest way to rear chickens is to put the mother in a bottomless coop with bars down the front, through which the chickens can go, and this coop can be placed on a fresh piece of grass every day after the sun has dried the earth, as dampness must be avoided. This obviates the necessity of cleaning out the coops every day, a thing often not done—and then the filth causes yaws and roup to break out. Cleanliness is necessary. You cannot confine chickens closely unless grit or sharp gravel is provided, or the food will cause indigestion.

When nine weeks old the hen should be taken away, as she would likely continue to go for three months if left to herself; but in our warm climate the chicks can well take care of themselves before that time. From three to four months old the chickens should be accustomed to roost instead of going to their box.

COCKERELS.

At four months old the young cockerels should be separated and put by themselves; a little wattle run on grass and a rough little house are sufficient. They should be well fed and watched, so that the best one may be selected to keep or exchange; then the others should be sold for stock-birds or fattened off quickly for market. Corn, cocoa-nut, boiled, green and ripe bananas, duck-ants, and worms, and any 'provisions' are what should be fed for fattening. To find the best cockerel, take the most precocious fellow who 'bosses' the rest, who puts on airs, and likes to practice crowing.

It is possible that you may be able to sell the cockerels for breeding purposes. In that case they should not be fed on such fattening foods, but more as directed for laying hens. It is best not to allow the cockerel retained, to run with hens until he is seven months old for the smaller breeds, and eight months old for the larger breeds. When kept separated until fully grown, the males make much more vigorous sires. Of course this young cockerel may not be used with his mother, sisters or half-sisters, nor may the first cock be used with his daughters. Therefore it is better to get new blood altogether by purchase or exchange.

AVOID IN-BREEDING.

The question of in-breeding is a much vexed one. Suffice to say that for utility purposes in the West Indies, it gives strength and vigour to your flock and saves much trouble and sickness *to introduce a fresh unrelated cock to your hens every season*. Cocks of breeds like Leghorns and Minorcas and Old English Games, although very precocious, are best kept until six or seven months old; Plymouth Rocks, Orpingtons, and Wyandottes are not fit until eight months old; Indian Games will not likely work until nine months old.

NUT GRASS.

Of the numerous weeds which infest West Indian fields and gardens none is a greater nuisance to planters, or is so difficult of eradication as the Nut grass (*Cyperus rotundus*). The plant, which is indigenous to most tropical and temperate regions of the globe, is known under a variety of names; often as 'Coco' in the United States; 'Kudna-marra' in South Australia; 'Mutha' or 'Motha' in Bengal; and as 'Nut grass' or 'Devil's grass' in the West Indies. The latter name, however, applies chiefly to Trinidad and Grenada and must not be confounded with the Bahama grass (*Cynodon Dactylon*) also known in some of the West Indian islands as Devil's grass. The latter is a true grass whilst the so-called Nut grass is really a sedge, and what is popularly called 'the nut' is a tuber. The plant in question is so well known as to need no description. It may, however, be mentioned that the chief peculiarity of this sedge, lies in the small potato-like tubers which are produced at intervals along the slender root-stock below the surface of the ground. The United States Department of Agriculture some time ago issued a Circular on Nut grass prepared by Mr. L. H. Dewey, Assistant Botanist, from which we extract the following:—

'Each tuber and each seed under the proper conditions is capable of producing a new plant, so that the species is abundantly propagated in both these ways. The seeds have a hard coat and do not yield to digestion in the case of any ordinary farm animals except sheep. Manure, therefore, from cattle and horses fed on nut-grass hay is likely to reseed land abundantly with the weed.'

The tenacity of life shown by the plant is remarkable, and people generally are so familiar with the nuisance that the appearance of nut grass in field or garden has come to be regarded as a matter of course and a necessary evil. While it may not perhaps be possible to exterminate the pest, it should however be remembered that almost any weed can be kept in check and controlled within certain limits at a reasonable cost.

Various methods to get rid of nut grass have been suggested, amongst which mention may be made of the following:—

(1) Preventing the production of seed.
(2) Digging up and removal of the root stocks.
(3) Starving the root stocks by preventing the development of green leaves above ground.
(4) Smothering the plant by planting other crops so as to exclude light.
(5) Application of coal oil, carbolic acid, salt, or sulphuric acid.

The following extract is from an article by the Hon. G. D. Tillman, quoted by Mr. Dewey in the pamphlet above referred to:—

'The plan of campaign to extirpate nut grass is simply to prevent it maturing seed above ground. Nearly everybody thinks that the nuisance reproduces itself from the nut alone, whereas it propagates a thousand times more from the seed. Hence, effectually and quickly to destroy nut grass on any land infected with it, the soil should be frequently stirred so as to stimulate each tuber and seed to sprout. The secret of success, is merely to cut down every tall stem, while in the flowering stage at the latest, and the sooner the better. The old method for destroying coco, by cutting it off under the surface of the ground every time a sprig appears above the surface, is a useless expenditure of labour. It is advisable to plant the land in some tall-growing crop which will not cover or obscure the coco seed stems, and thus keep them from being observed and destroyed. By the above method two years are ample time in which to rid any ground of coco. The popular error that coco propagates from the nut alone, explains the whole story of its universal triumph over the patience, sweat, curses, and blows of the millions who have warred on it.'

In addition to the above methods, Mr. Dewey further suggests: 'Choke it out with a vigorous growing crop. Crimson clover is the best for this purpose in most localities.' An suitable plant in the West Indies would probably be found in our cow-peas or woolly pyrol.

It is interesting, however, to find that even the nut grass so widely and bitterly anathemized by agriculturists, has its useful qualities. The Australian aborigines are said to use the tubers in a roasted condition as an article of food. In Watt's *Dictionary of the Economic Products of India*, it is stated: 'The rounded rhizomes are said to yield an essential oil, which the natives of India use to perfume their clothes. It is also used in certain dye preparations to impart a perfume to the fabric. The roots are used medicinally as a diaphoretic and astringent. Stimulant and diuretic properties are also attributed to them. In native practice they are held in great esteem as a cure for disorders of the stomach and irritation of the bowels. The bulbous roots are scraped and pounded with green ginger and in this form, mixed with honey, they are given in cases of dysentery in doses of a scruple. Herodotus notices it as an aromatic plant used by the Scythians for embalming. Cattle eat this so-called grass, and hogs are remarkably fond of the roots.'

DEPARTMENT NEWS.

The Commissioner of Agriculture for the West Indies (Dr. D. Morris, C.M.G.,) after visiting, on official duty, the islands of Grenada, St. Vincent, Tobago and Trinidad landed at Barbados on the 3rd. instant. Dr. Morris spent eight days at St. Vincent and carefully studied, from the agricultural point of view, the condition of the estates on the Leeward and Windward coasts as affected by the recent volcanic eruptions. He visited the new settlements of 'sufferers' at Campden Park, Questelles and Clare Valley, also those at Layou and Park Hill. The results of his observations will be shortly embodied in a report to be submitted for the information of the Secretary of State. At Grenada, Dr. Morris attended a special meeting of the Agricultural Society, (his Excellency the President in the chair) and discussed several topics of interest, including the occurrence of thrips at St. Andrew, and the steps to be taken to deal with 'Sooty blight' so prevalent in some districts of the island. Dr. Morris will, for the present, remain at Barbados, but as soon as the quarantine is removed, it is probable he will visit the Virgin Islands and Jamaica.

On the recommendation of the Commissioner of Agriculture for the West Indies, the Secretary of State for India, in Council, has appointed Mr. H. Maxwell-Lefroy, M.A., to the post of Entomologist to the Government of India. This is a valuable appointment for which Mr. Maxwell-Lefroy's excellent work in the West Indies specially fits him. Mr. Maxwell-Lefroy will vacate his appointment in connexion with the Imperial Department of Agriculture on the 14th. proximo.

Professor J. P. d'Albuquerque, M.A., Island Professor of Chemistry and Agricultural Science, and Chemist-in-charge of Sugar-cane Experiments under the direction of the Imperial Department of Agriculture at Barbados, returned to the island and resumed the duties of his appointment on January 6, 1903.

Vitality of Spores.

A recent number of the *Botanisches Centralblatt*, records an interesting instance of retention of vitality of the spores of a plant, (*Marsilea vestita*). It appears that plants of this species were dried as herbarium specimens, and on placing some of the spores under favourable conditions, eighteen years afterwards, they germinated and grew in a normal manner.

GLEANINGS.

Spathodea campanulata is now flowering at the Botanic Station, Grenada, and with its masses of large red flowers forms one of the most striking trees in the collection. The crumpled yellow coloured tips of the corolla lobes give the flower a beautiful finish

The California palm, *Washingtonia filifera*, was flowering a month ago at the Botanic Gardens, Grenada. It is a very quick growing palm. The flowers were very delicate in appearance and attracted large numbers of bees.

An experiment plot of limes, about an acre in extent, has been formed on the Spout Lands, Grenada, under the superintendence of the Curator of the Botanic Station. The majority of the plants have made a satisfactory start. These were planted during the month of November. The Agricultural Society at whose suggestion the plot was formed, bore the expense incurred in the actual planting, and the plants were supplied free from the Botanic Station. For a previous reference see *Agricultural News*, Vol. I, p. 195.

Plants of British Honduras mahogany and British Honduras logwood raised from seed received from the Commissioner of Agriculture for the West Indies were planted out in the Botanic Station, Grenada, and on the Spout Lands, during the month of December last.

The experiments carried on at the Botanic Station, Tobago, with seedling sweet potatos have given good returns. The plants generally are different in growth and colour from those cultivated in the island and good varieties are expected from the selected seedlings.

The Curator of the Botanic Station, Tobago, reports that recently he visited a stock and poultry farm, and saw a number of sacks of sunflower seeds *(Helianthus annuus)* which had been imported from America, for feeding poultry. He obtained a quantity of the seeds which grew freely and produced good heads, some 14 inches across. He suggests that the cultivation of sunflowers would be a profitable industry if taken in hand and the seeds locally used.

Mr. H. H. Cousins, the Island and Agricultural Chemist at Jamaica, is now in charge also of the Meteorological service of the island.

The large fish known at St. Kitt's as the Bass is, Mr. T. Belling writes, presumably the Tarpon. Its large scales agree with the description given in the *Agricultural News*, Vol. I, page 233. It sometimes comes quite close to the shore.

Sea-eggs are common around the shores of St. Kitt's. The black, long-spined kind infests the coral reefs and the still water within them, causing painful injury to the incautious swimmer. The short-spined, whitish, edible kind can be seen in places in numbers, but they are not collected, as at Barbados, and their value and mode of preparation as food are alike unknown.

The fruits of the Royal or Cabbage palm are used in Porto Rico for fattening pigs.

Messrs. Gillespie Bros. & Co., of New York, write:—'We hope we may receive some good lots of onions during 1903 from the British West Indies, and trust New York prices will be favourable.'

The owner of St. Elmo estate in Dominica has recently succeeded in fruiting a young apple tree which he imported about three years ago from Nova Scotia. The apples, which were shown to Dr. Morris during his recent visit were such handsome specimens that they would have been creditable even on an exhibition table in England. Several of them averaged 11⅛ inches in circumference and weighed 10 ounces each. The tree is growing at an elevation of 1,800 feet.

With reference to the note on Screw Pines in the *Agricultural News*, Vol. I, p. 281, Mr. J. Jones writes, it is interesting to record that the dry leaves of *Pandanus utilis* are in great demand in Dominica for making hats. These are sold locally at prices rising from 6*d*. to 1*s*. 6*d*. each according to the degree of workmanship. The plant being rather scarce in the island, a patch is now being raised at the Botanic Gardens for distribution to persons interested in hat making.

The *St. Croix Avis* of December 10, 1902, records that an attempt has recently been made in the Danish West Indies to establish a 'Dried banana' industry. Mr. Hoffmann Bang arrived at St. Thomas from Denmark in connexion with the industry and has since been joined by his son. 'The machinery for his process has been erected in St. Thomas. Mr. Bang does not make banana flour but dries the ripe fruit and puts it up for export, ... closely packed in small, handy card-board boxes with printed directions for various ways of using them.'

A translation of the paper on 'Banana Cultivation in Jamaica' read by the Hon'ble W. Fawcett at the last West Indian Agricultural Conference (*W.I.B.*, Vol. III., pp. 153-71) has appeared in recent numbers of the *Revue des Cultures Coloniales*.

According to the *Demerara Argosy*, Messrs. Hamel-Smith & Co., of 112, Fenchurch Street, London, are putting on the market an improved cacao tree scrubber. The scrubbers are made with a solid round back, through which a hole is bored to take the stick or bamboo, the same as with cacao pruners to manipulate it with from the ground, and when not required for cleaning the upper part of the trees, if the stick is removed, it will be found that the round back gives an excellent purchase for the hand to grip, and use as an ordinary hand scrubber, especially if a band is tucked across the back as with a dandy brush. It is claimed that these brushes can be used without climbing up the trees and destroying the chances of a good crop of pods.

EDUCATIONAL.

School Gardens.

In the *Agricultural News*, Vol. I, p. 285, an account was given, illustrated with a diagram, of the plan of working a garden in an English school. On page 13 of the present volume a second illustration shows exactly the crops grown on each garden bed.

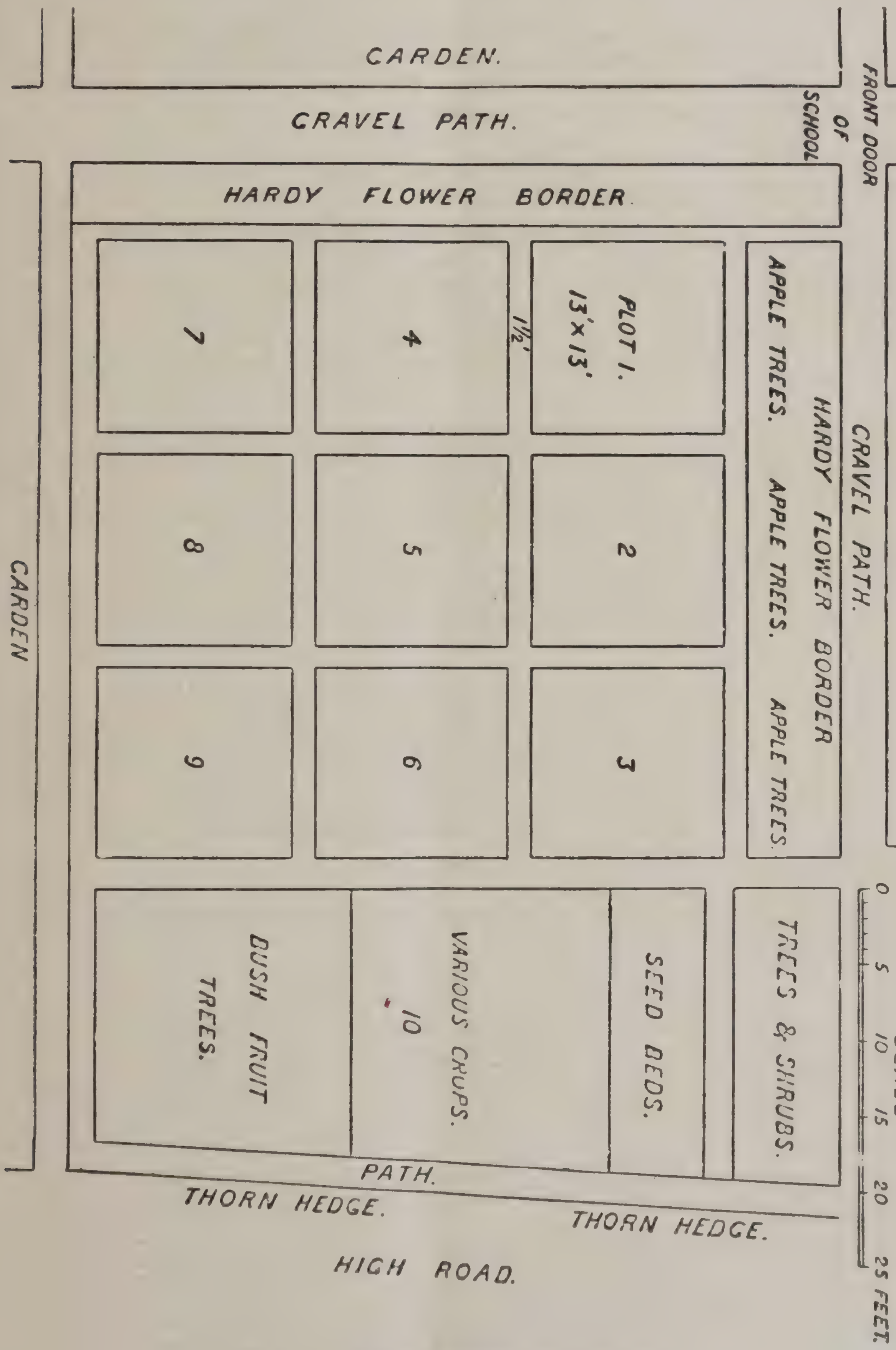

Fig. 4. Arrangement of Garden.

The following account of the method in actual operation at another school is taken from the pamphlet of the English Board of Education, referred to on page 13 and reprinted in the *West Indian Bulletin*, Vol. III, 218-20:—

The plan below is of a garden attached to a rural school with an average attendance of 100 under a Head Mistress, who takes the gardening class herself.

Each plot measures 13 feet by 13 feet. Plot No. 10 is used as a seed bed and for bush, fruit trees and various crops, such as scarlet runners, tomatos, etc., for which there is no room on the other plots. Upon the other plots vegetables are grown in the following order:—Potatos, early and main crop (one row each), carrots (two rows, one for exhibition and one for ordinary use), onions (two rows), beetroot (one row), turnips (one row), parsnips (one row), peas or French beans (one row). Lettuce is planted out and parsley sown as a border to the paths. Carrots and parsnips for exhibition are sown in holes made by a crowbar or long dibber, one foot apart, the holes are then filled with finely sifted soil in which about three seeds are sown. The crops are reversed from one end of the plots to the other in alternate years, running from East to West.

As a further means of changing the rotation they will be grown from North to South this year. After the summer crops have been lifted the refuse is burnt on each plot. All spare ground is then manured, dug, or trenched for the winter. The instruction is given for two hours each week, and rather more in the busy season. Lessons on plant and animal life in the lower standards as in Scheme VI of the Specimen Courses of Object Lessons already issued by the Board of Education. Visits to good gardens are found to be of great help. A record of the work done is kept by each boy, with notes on the soil, digging, pruning, manures, etc. The boys have additional practical instruction in root-pruning, pruning, and in growing strawberries and asparagus in the teacher's own garden. In winter and wet weather conversational lessons are given, illustrated by diagrams, pictures, magazines, etc.

Lectures to Teachers at Barbados.

The second lecture to the Elementary School Teachers at the St. Thomas' centre, on the manner and method of teaching the principles of agriculture, by means of object lessons, was delivered at the school house, Clifton Hill, on Saturday, January 9, by Dr. Longfield Smith.

Thirty-eight teachers attended.

The object lectured on was 'Water.'

The next lecture will be delivered at Harrison College, on January 24, on 'Soil.'

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—December 23, 1902.—Messrs. J. Hales Caird & Co., Messrs. Kearton Pipen & Co., Messrs. E. A de Pass & Co., 'The Gardeners' Chronicle,' December 30, and 'The Public Ledger,' December 20, 1902.

Aloes—Curaçoa, 14/6 to 40/-; Barbados 13/- to 35/- per cwt.
Arrowroot—St. Vincent, $2\frac{1}{2}$*d.* to 4*d.* per lb.
Balata—Demerara sheet, 2/5 per lb.
Bees-wax—Jamaica, £8 5*s.* per cwt.
Cacao—T'dad, 58/- to 67/- per cwt. ; Dominica 55/- to 57/- per cwt. ; Grenada, common to fine 56/- to 60/6 per cwt. ;
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 38/- to 97/6 per cwt. Costa Rica, 40/- to 84/- per cwt. ; Peaberry 54/- to 64/- per cwt.
Cotton—West Indian $4\frac{3}{4}$*d.* to $5\frac{5}{16}$*d.* per lb.
Fruit—
  Bananas—8/- to 13/- per bunch.
  Oranges—Jamaica, 9/3 to 13/- per box of 150 to 176.
  Pines—St. Michaels 1/10 to 6/6 each.
Fustic—£3 10*s.* to £4 5*s.* per ton.
Ginger—Jamaica, 35/- to 60/- per cwt.
Honey—Jamaica 18/- to 22/- per cwt.
Kola Nuts—1*d.* to 4*d.* per lb.
Lime Juice—Raw, $9\frac{1}{2}$*d.* to $10\frac{1}{2}$*d.* per gallon ; Concentrated, no quotations
Lime Oil—1/2 per lb.
Logwood—Jamaica, £4 to £4 10*s.* per ton.
Mace—1/2 to 1/10 per ℔.
Nitrate of Soda—Agricultural £9 5*s.* per ton.
Nutmegs—106's to 92's @ $8\frac{1}{2}$*d.* to 11*d.* ; 70's to 64's @ 1/9 to 2/4 per lb.
Pimento—$2\frac{1}{8}$*d.* to $2\frac{1}{2}$*d.* per lb.
Rum—Demerara 9*d.* to 10*d.*, Jamaica 1/7 to 7/- per proof gallon.
Sugar—Muscovado quiet. Grocery crystallized 14/- to 16/3 per cwt.
Sulphate of Ammonia—£11 15*s.* to £11 16*s.* 3*d.* per ton.

Halifax, N.S.—The 'Maritime Merchant,' November 20, 1902.

Molasses—Barbados 24c. to 35c. Porto Rico 31c. to 34c.
Oranges—Jamaica, $2.75 to $3.00 per box and $5.00 per barrel.
Sugars—Bright yellow, $3.70 ; No. 1 yellow, $3.40.

New York,—December 12, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, 80c. to 85c., eight hands, 60c.
Cacao—African, $12\frac{3}{4}$c. to 13c. ; Caracas, $13\frac{3}{4}$c. to $16\frac{1}{2}$c. ; Jamaica, $10\frac{7}{8}$c. to $11\frac{1}{4}$c., ; Grenada, $13\frac{3}{8}$c. ; Trinidad 13c. to 14c. per lb.
Cocoa-nuts—Trinidads $15.00 to $17.00 ; Jamaicas $20.00 per M.
Coffee—Rio, good ordinary $5\frac{1}{4}$c. ; Jamaica, fair to good ordinary $6\frac{3}{4}$c. to 8c. per lb. ; Manchester grades $8\frac{1}{2}$c. to $10\frac{1}{2}$c. per lb.
Grape Fruit—$4.00 to $6.00 per barrel.
Oranges—$3.25 to $3.75 per barrel.
Pimento—$4\frac{1}{2}$c. per lb.
Rubber—Nicaragua scrap 60c. to 61c. per lb ; Guayaquil strip 55c. to 56c. per ℔ ; Esmeralda sausage 60c. to 61c. per lb.
Sugar—Muscovado, 89°, $3\frac{7}{16}$c. to $3\frac{1}{2}$c. per lb. ; Centrifugals, 96°, 4c. to $4\frac{1}{32}$c. ; Molasses, 89°, $3\frac{3}{16}$c. to $3\frac{1}{4}$c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—December 30, 1902.—Messrs. G. W. Bennett Bryson & Co., Ltd.

Molasses—Market closed.
Sugar—Market closed.

Barbados,—January 3, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb. Dull.
Cacao—$11.50 per 100 lb.
Coffee—Jamaica and ordinary Rio $8.50 to $9.50 per 100 lb. respectively.
Hay—90c. per 100 lb.
Manures—Nitrate of Soda $65.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $80.00 to $85.00 ; Sulphate of Potash $67.00 per ton.
Molasses—No quotations.
Onions—Madeira $6.00 per 100 lb. Wanted.
Potatos—$1.80 per 160 lb.
Rice—Ballam $4.50 per bag (190 ℔.) ; Patna $3.50 per (100 ℔.) ; Seeta $3.50 per (100 ℔.) ; Rangoon $3.00 per (100 lb.)

British Guiana,—December 31, 1902.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $9.00 per barrel.
Balata—40c. to 42c. per lb.
Cacao—native 11c. to 12c. per lb.
Cassava Starch—$7.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica $11\frac{1}{2}$c. to 12c. per lb. (retail.) —Creole, 11c. to 12c. per lb.
Eddoes—$1.68 per barrel.
Onions—Retail $3\frac{1}{2}$c. ; Garlic 7c. to 8c. per lb.
Pea Nuts—Curaçoa 4c. ; American 5c. per lb. (retail.)
Plantains—28c. to 40c. per bunch.
Potatos English—$2.50 to $3.50 per barrel.
Rice—Ballam $4.75 to $4.80, ex store ; Patna and Seeta $5.75 to $6.00 per bag.
  —Creole Rice 18c. per gal.
Sweet Potatos—Creole $1.92 per barrel.
Tannias—$2.16 per bag.
Yams—$2.64 per bag.
Molasses—Vacuum Pan, yellow, 15c. to 16c. per gallon, casks included.
Sugar—Dark Crystals $2.02½ to $2.12½ ; Yellow $2.10 to $2.25 ; Molasses $1.40 to $1.60 (nominal) per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—Messrs. Gordon Grant & Co., December 31, 1902, and Messrs. Edgar Tripp & Co., January 2, 1903.

Balata—Venezuela 42c. to 43c. per ℔.
Cacao—Ordinary $12.50 ; Estates $12.75 to $13.65 per fanega.
Coffee—Venezuelan 6c. to $6\frac{1}{2}$c. per ℔.
Onions—$2.50 per 100 lb.
Potatos English—$1.35 per 100 lb.
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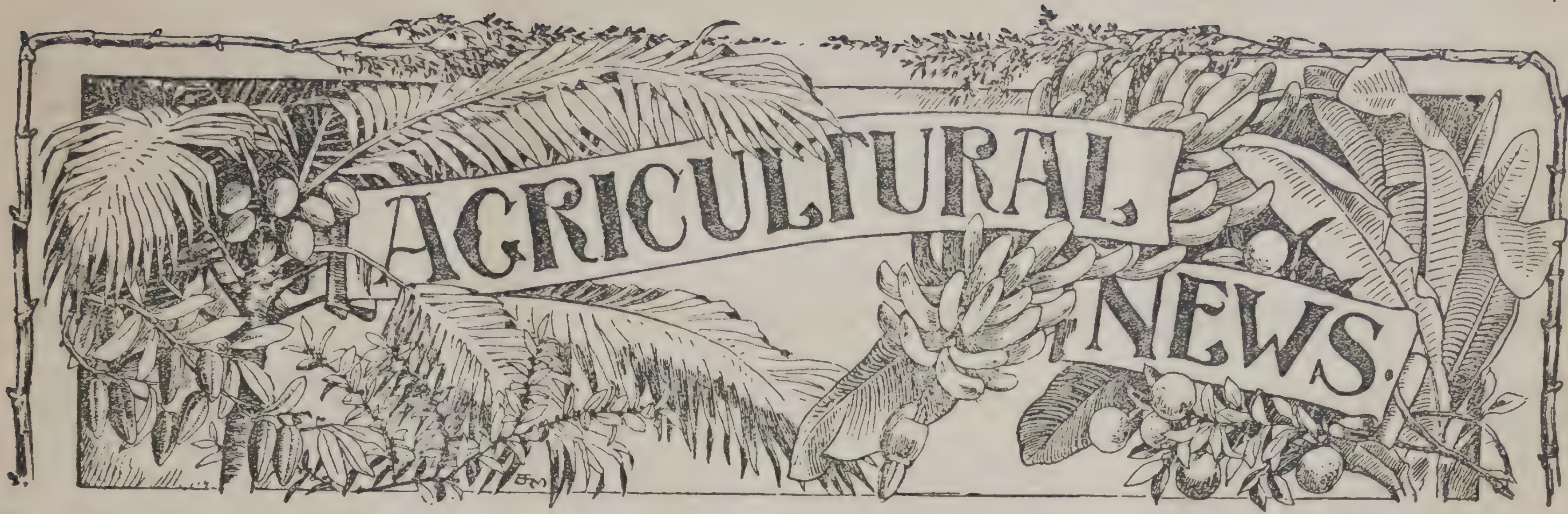

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A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Seedling Canes.

A larger appreciation of seedling canes, that is, canes raised from seed as distinct from those propagated by means of cuttings or tops, is becoming apparent in the West Indies. At first seedling canes were regarded with a certain amount of suspicion and it was only under force of circumstances that the planters at Barbados and Antigua took up the cultivation of seedling canes on a large scale. In those islands the Bourbon cane that had been exclusively planted for nearly 100 years had become so susceptible to the attacks of fungus diseases that its further cultivation was impossible. Elsewhere, as in Jamaica, British Guiana and Trinidad, the Bourbon cane has not been so seriously attacked by fungus and hence in those colonies the planters, except in a few instances, have not been compelled at once, to take up seedling canes. They have, fortunately, been in a position to discriminate at leisure between the relative merits of seedling and other canes and to choose those only that promised the best results on a commercial scale.

The results of the very careful and complete experiments carried on for so many years with seedling canes at Barbados, Antigua and St. Kitt's, and immediately published for the guidance and information of the planting community, have been of great service in those islands. A feature of great importance in regard to these experiments is the fact that the planters themselves have taken so large a share in testing seedling canes on a considerable scale on their own estates. At the present time probably a larger area is under effective cultivation in seedling canes at Barbados, Antigua and St. Kitt's than anywhere else in the tropics. Also the results have been made accessible, not only in detail, in annual folio reports, but also in the summarized pamphlet form wherein the main facts alone are given. In regard to the latter Sir Nevile Lubbock, the Chairman of the West India Committee wrote, January 9, 1901: 'These interesting pamphlets cannot fail to be of great value to the planting community; and it would be well if all such experiments were uniformly tabulated in as concise a manner as are those in the Barbados and Leeward Islands' pamphlets.'

A new feature introduced into the Barbados Pamphlet Report for 1902 was a comparison between the results in that year and those of the years 1900 and 1901. The planters now clearly understand that the position occupied by a seedling cane in one year's experiments must be carefully compared with the position it occupied in the experiments of previous years. There is thus no danger of hasty generalization from the results of any one year. Meanwhile, the planters are taken into confidence, they know exactly what is going on and are furnished with the most recent facts likely to be of interest to them.

In a return recently issued by the Board of Agriculture in British Guiana, (which we hope shortly to reproduce in these pages), it is evident that in that colony there are seedling canes of considerable promise growing on land where the Bourbon cane does not flourish. In other words, in some parts of British Guiana, as at Barbados and Antigua, it has been found necessary to substitute seedling canes for the Bourbon cane in order to produce a high yield of sugar. In the Demerara *Daily Chronicle* for January 10, the manager of the important Diamond Estate is quoted as stating that about 2,000 acres of seedling canes are under cultivation by him, and as a rule 'we have found them rather better all round than the Bourbon.' In the Agricultural Summary for 1902, published in the Demerara *Argosy* of January 3, a correspondent states that about 7,500 acres are under seedling canes in British Guiana, but 'so far it cannot be said that any seedling cane has been grown which in all round good quality is equal to the Bourbon.' This appears to contradict the opinion expressed by the manager of the Diamond plantation, but the *Argosy* correspondent goes on to say 'the majority of the seedlings, however, are hardier, and most of them ratoon better than the Bourbon, and on poorer soils they have given returns in excess of those obtained from the Bourbon grown under similar conditions.'

We hope to return to this subject later. It is evident, however, that seedling canes, in spite of some disappointment in the past, are being carefully tested over extensive areas in the West Indies and we are not without hope that seedling canes of high saccharine quality will, eventually, be obtained that will eclipse the Bourbon even in its most favourable localities.

SUGAR INDUSTRY.

Seedling Canes in British Guiana.

The following account is taken from the summary of Agriculture in British Guiana for 1902, published in the Demerara *Argosy*:—

> There are about 7,500 acres under seedling cane cultivation on the different estates throughout the colony, and so far it cannot be said that any seedling cane has been grown which in all round good qualities is equal to the Bourbon. The majority of the seedlings, however, are hardier, and most of them ratoon better than the Bourbon, and on poor soils they have given returns in excess of those obtained from the Bourbon grown under similar conditions. The seedlings unfortunately, almost without exception possess one or more undesirable characteristics such as difficulty in connexion with milling, poor quality of juice and low value of megass as fuel. Careful experiments on a manufacturing scale are being conducted on nearly every sugar estate in the colony, and a large amount of useful information is being collected and tabulated by the Experimental Cane Cultivation Committee nominated by the Agricultural Board. The most promising varieties of canes other than Bourbon so far cultivated are D. 109, White Transparent, D. 625, D. 145, B. 147, D. 78, D. 95 and D. 74. The D. 74 which has given such excellent results in the Hawaiian Islands and Louisiana requires a rich porous soil, and it does not thrive well in the stiff clay soils of this colony. In Barbados B. 208 continues to hold the leading place as the most promising cane, since B. 147 was more or less discarded, and in this colony B. 208 is now under trial to ascertain whether it suits the conditions prevailing as regard soil and climate.

Stripping Canes.

From a recent report of the Committee on cultivation in the Hawaiian Islands, we extract the following interesting note on what is regarded as rather an important detail in the routine of cane cultivation in those islands:—

> The removal of dead leaves from the cane, generally, called 'stripping,' is a process in our cultivation that is very essential in some sections of the islands; and we think is necessary in more or less degree in all districts for the proper development of a cane crop. Where the crop is not exposed to drought for a long period the best results are usually obtained from canes stripped some months prior to harvesting. Stripping also reduces the amount of destruction caused by borers, rats, and other pests; lessens the cost of cutting, and allows of sending canes to the mill free from a coating of dry leaves, which is very much against good extraction.

Stripping was formerly practised to a great extent by cane planters in the West Indies but of late years it has been abandoned. Opinions vary considerably as to whether the results justify the expense.

Crop Prospects in Trinidad.

The Trinidad *Mirror* for January 16, gives the following account of the outlook for the sugar crop in that island :—

With a continuance of the very favourable weather now existing, many of the sugar factories in the Naparimas and Savana Grande will start grinding operations shortly and by the end of January the sugar campaign will be in full swing. Reform, the Usine St. Madeleine and Malgretout are expected to be the first to get into action to be followed by Hindustan and others. Cultivation was economically prosecuted during the past year owing to the unsettled state of the sugar outlook due to the uncertainty as to the result of the Brussels Convention, and in consequence this year's crop is expected to fall short of previous ones. The situation has, however, changed, and operations in the field have since been vigorously carried out. As usual, many improvements have been effected since last crop in the Usine St. Madeleine for the more economical working of this extensive factory. Business men and others are anxiously awaiting the working of the factories, for during the crop season a great impetus is given to trade generally.

PAPAIN INDUSTRY AT MONTSERRAT.

Reference has already been made in the pages of this Journal to the preparation of commercial papain. It may not be generally known that a small and remunerative industry in dried papaw juice has existed at Montserrat for several years. Regarding this the Agricultural Instructor, Mr. Jordan, has recently contributed the following interesting notes :—

The trees are usually self-sown, growing among rocks on the mountain sides, or else are planted around the houses of the peasantry. The peasants collect the juice in calabashes into which a small quantity of water is first placed. The juice is obtained by lightly scoring the rind of the fruit with a knife or some other sharp instrument. As the juice falls into the water it thickens to the consistency of ice-cream and in this state is sold to the manufacturer at the rate of $\frac{3}{4}$*d.* to 1*d.* per ounce. The method of preparation has been fully described by the Hon'ble Francis Watts in the pages of the *Agricultural News* (Vol. I, pp. 4 and 5).

There is at present a small plot of 120 trees under observation at the Grove Experiment Station, of these about twenty five per cent. are males or non-fruiting trees. The plot was planted in May 1902, and has yielded to the end of December last, a period of about seven months, over 10 ℔. of juice. There are two varieties under cultivation, the long and the round fruited. With regard to the respective merits of these, our experience is that the long-fruited variety bears earlier and nearer the ground, both strong points in its favour. It is however claimed that the round variety gives the largest quantity of juice. This may be true, but as the latter grows to a considerable height the cost of collecting the juice is greatly increased in the case of old trees.

I may add that one of the student-gardeners at the Station, where trees are plentiful, can collect on an average 4 oz. of juice per hour. The price of dried papain at the present time varies from 12*s.* to 16*s.* per ℔.

THE MANAGEMENT OF AN ANTHRAX EPIDEMIC.

In view of the recent outbreak of anthrax at St. Vincent any information on the subject of its successful treatment in other countries will be of interest. The following account is abbreviated from Bulletin No. xxxii, of the Delaware College Agricultural Experiment Station.— *Combating Anthrax in Delaware* :—

The first point noted is the difficulty that is experienced in securing timely information of an outbreak of anthrax. It has been found that if the official placed in charge believes in giving publicity to his work, imposes strict quarantine and abandons the stricken herd and farm to the disease, then secrecy will be observed, and the neighbouring farmers will approve that course. If, however, it is believed that the official will avoid publicity, will prevent heedlessness in disposing of carcases, will begin his fight immediately upon the infected farm, and will, in brief, regard the interests of the sufferer as well as those of the general public, then timely and willing information will be given with the full consent of the community. Another difficulty lies in the fact that certain people are ignorant of the symptoms of the trouble. Every effort was made to reduce the number of these people by the publication and distribution of bulletins. The best results were obtained by establishing close relations between practising veterinarians and the Experiment Station.

The immediate cause of anthrax is a bacillus, an extremely minute plant, which under the highest powers of the microscope is seen to be rod shaped and approximately three times as long as broad ; six thousand of them placed end to end would measure an inch.

The plants themselves are not difficult to kill, but given free access of air they form spores (seeds), which will remain alive under the most trying circumstances for an almost indefinite time. When brought into an animal's body, these spores germinate quickly, and the plants multiply with great rapidity. The spores can also germinate and multiply outside the animal's body, under conditions which sometimes exist in the soils of low lands. If, therefore, anthrax becomes well established in a meadow, the possibilities that it will persist there are strong.

Anthrax is widely spread among the live stock of semi-barbarous people ; bones and hides from such sources should be regarded with suspicion and low land products should be avoided. Flies and other insects may be regarded as probable carriers of infection wherever anthrax carrion is exposed. In Delaware the morocco factories are regarded as the original source of the contagion.

When anthrax attacks herds at pasture upon meadows, the tendency is to move them at once to higher lands ; in this way sometimes the contagion has been carried by apparently healthy animals to new pastures. The rule is given that after five days have passed without deaths, the herd may be considered as free from contagion and can be released to range over clean pastures.

Diseased animals must be prevented from seeking the water courses, as the discharges either before or after death may, in flowing streams, contaminate distant herds.

The tendency to allow a carcase to lie exposed, or to cast it into the river, is one which should be combated by every reasonable method. Cremation should be practised in spite of its difficulty. It is recommended that a bounty should be paid for the carcase of an anthrax cow, conditional upon its cremation, and that a penalty should be imposed in case of wilful neglect of this precaution.

WEST INDIAN FRUIT.

MANGOSTEENS.

Among the East Indian fruits which have been introduced into these islands few surpass the 'mangosteen' for delicacy of flavour. The tree is rather delicate and a slow grower, requiring apparently special conditions for its development, and produces its fruits at irregular intervals. Hence it is by no means common in the West Indies and few people are acquainted with it. Reference was made in a recent number of the *Agricultural News* to the fruiting of a tree at St. Aroment Estate, Dominica, and Mr. Hart has on more than one occasion recorded a fair yield of fruit from trees at the Botanic Gardens, Trinidad. Trees at the Castleton Gardens in Jamaica have also fruited during the last twenty years. The mangosteen is a member of a comparatively large genus of plants *(Garcinia)* many of which produce fruits more or less resembling each other in general appearance. The fruits of some of these are edible; others are of medicinal and commercial value, but all of them are inferior to the mangosteen in flavour. Under the name of 'mangosteen' a few trees of two closely related species, *(Garcinia indica* and *Xanthochymus)*, occur in the West Indies. The fruits of these, although edible, are of poor flavour in comparison with the mangosteen. Plants of these species have, in some cases, been carefully tended under the impression that they were true mangosteens—and it is not surprising therefore to find that the mangosteen is sometimes regarded in these islands as a considerably over-rated fruit.

The following description of the species of *Garcinia* above referred to is taken from Sir George Watt's *Dictionary of the Economic Products of India*, and will enable the true mangosteen to be distinguished from the other species.

Garcinia mangostana (The mangosteen). An evergreen tree, native of the Straits, cultivated in British Burma on account of its fruit. The fruit is highly esteemed both by Europeans and natives and is indeed considered by many to be the most palatable of all fruits. It is about the size of a small apple with a thick succulent and astringent rind of a *reddish brown colour externally but bright crimson on section.* Within this are placed the four to twelve large seeds each surrounded with its juicy *white* aril, sweet and acidulous, with a delicate flavour like the odour of the primrose.

Garcinia indica (Kokam Butter). A slender tree with drooping branches found on the Ghats of the Konkan and Kanara and considerably cultivated in gardens of that district. It bears a conspicuous *spherical purple fruit*, the size of a small orange. A valuable oil, 'Kokam butter,' is obtained from the seeds of the fruit to the extent of about 30 per cent. Kokam butter yields stearic acid in larger quantities and in a purer state than do most other fats, and appears to be particularly suitable as a substance for candle making. The purple fruit has an agreeable flavour and has long been esteemed as an article of diet. One or two plants of this species are cultivated under the name 'mangosteen' at Montserrat.

Garcinia Xanthochymus (Cochin-goraka). A widely distributed species met with in Eastern Bengal, Southern India and the Andaman Islands. The fruit is temptingly beautiful; as big as an orange, *pointed, smooth and bright yellow.* It is however strongly acid and is therefore only used by the poorer natives. A few specimens of this tree are known as 'mangosteen' in Barbados and Grenada.

Reference might also be made to a very small variety of the ordinary mango which is sometimes known as 'mangosteen', the name in this case being probably a corruption of 'mangotine.'

GRAPE CULTIVATION IN BRITISH GUIANA.

The following report by Mr. R. Ward, Agricultural Instructor, on grape culture in British Guiana and the varieties most suitable for cultivation was recently presented to the Board of Agriculture for that colony:—

There are several unnamed varieties commonly grown here, one of these is a very inferior small white or green, and another a very small purple, both of which are very prolific.

A much finer variety known as the green muscatel is also being successfully grown and is becoming more extensively cultivated. This variety is not so prolific as the two unnamed ones mentioned above, but the bunches, as well as the individual grapes, are much larger and compare favourably with any imported into this colony.

There are one or two other white or green varieties intermediate between the above, which produce very fair-sized bunches and the grapes are of good flavour. These varieties, which I have met with on one or two occasions are well worth cultivating.

The above comprise all the different varieties of grapes known to me as being generally cultivated in the colony, but of recent years several of the different varieties cultivated in England have been introduced by some people here and grow with partial success. These are the Black Hamburg, Gros Colman, and Muscat of Alexandria. The partial failure to grow these varieties, I am of opinion, is due, in most cases, to the unfavourable situation and the conditions under which they are planted, as also to a want of proper knowledge as to their treatment and care throughout the various stages of their development.

With reference to the variety 'Trebbiano,' as far as I can ascertain there is none of it cultivated in this colony.

LIMES AT DOMINICA.

Recently ripe fruits of the ordinary lime, the new spineless variety and the Villa Franca or Sicily lemon, all grown at the Botanic Station, Dominica, were sent to the Hon'ble F. Watts, the Government Analytical and Agricultural Chemist at Antigua, in order that he might test the acidity of the juice of each kind. The results are as follows:—

	Citric Acid.	
	oz. per gallon.	*grains per oz.*
Juice from ordinary lime	13·22	36·15
Juice from spineless lime	13·80	37·73
Juice from Sicily lemon (Villa Franca)	11·05	30·22

In forwarding these figures, Mr. J. Jones, the Curator of the Station remarks: It will be noted that the spineless variety again stood at the top of the list as on a former occasion (see *Agricultural News*, Vol. I, p. 180). Dominica planters will be interested to learn that the lime yields a juice considerably richer in citric acid than the Sicily lemon.

BLACK BLIGHT IN GRENADA.

The following information is reprinted from the Grenada Government Gazette of December 31, 1902, in continuation of the note in the *Agricultural News*, Vol. I, p. 199. Specimens received from Grenada show that this Black Blight is caused by a few species of common scale insects, described in the pamphlet *Scale Insects of the Lesser Antilles* issued by the Department. It is to be hoped that the measures recommended will be generally adopted and prove successful:—

Black blight is greatly extending in some districts in this island. It is caused by insects found on the under side of the leaves of certain plants especially mango, breadfruit, guava, *pomme rose*, frangipani and others. When trees such as mango and breadfruit become seriously affected with the blight, they cease to bear, and in some cases trees have died from its effects.

The blight has not yet seriously attacked cacao, but it is possible it may do so in time, if other trees affected with it are allowed to remain in close contact with the cacao. It would then become a serious pest to the colony.

It becomes the duty of every owner of land, to his neighbours as well as to himself, that he should use his best endeavours to get rid of the blight from his property wherever it is present. It is well known that when one tree becomes affected, it will spread through a whole district.

The following hints are given to assist persons in getting rid of the 'Black Blight.'—

(1) Trees affected with blight, that are comparatively of no value, such as guava, frangipani, *pomme rose*, wild shrubs and forest trees should, if possible, be cut down to the ground and burned. The same could be done with many other trees such as inferior kinds of mangos, sugar-apple, sour sop, and in fact any trees affected with blight that the owner considers to be of no special value.

(2) Moderate sized trees such as good kinds of mangos, oranges, sapodillas, etc., might be sprayed. For small trees a knapsack sprayer or hand syringe will do, but for trees over 15 or 20 feet in height a 'Fruitall' sprayer should be used, one of which may be seen at the Botanic Station. The wash specially recommended by the Entomologist to the Imperial Department of Agriculture, known as rosin compound, is made up as follows:— Mix 4 lb. of powdered rosin, 3 lb. of powdered washing soda and 1 gallon of water. Boil, and when all is dissolved, *slowly* make up to 5 gallons. Boil the mixture till it becomes of a clear brown colour. This is the stock solution. Make this up to 30 gallons.

Other washes, rosin wash and whale oil soap, are also recommended, details about the preparation of which may be obtained by referring to Pamphlet Series, No. 7, issued by the Imperial Department of Agriculture.

Before spraying, the trees should be pruned by cutting out all useless and superfluous branches, which will allow of the wash getting on to the uppermost leaves.

(3) Trees too large for spraying should be 'lopped,' that is, all the branches cut off, leaving nothing but the main trunk and lower portions of the large branches. The cuts should be made as smooth and clean as possible and tarred to prevent decay and to allow the bark to cover the wounds. The standing trunks should then be washed with some solution to kill any scale insects that may be sticking to the bark. A good coating of white-wash will sometimes answer the purpose if carefully applied.

Several estates in the island are practically free from the blight as the owners have been in the habit of cutting down the trees on which it appeared to prevent it from spreading further. A few persons have already adopted the method described as 'lopping' with a fair measure of success.

Further information may be obtained on application to the Curator of the Botanic Station, and in the country districts from the Travelling Agricultural Instructor.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 31 of the previous number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

VOL. II. SATURDAY, JANUARY 31, 1903. No. 21.

NOTES AND COMMENTS.

Central Factories at Antigua.

At the meeting of the Legislative Council of Antigua on April 17, 1902, his Excellency Sir Henry M. Jackson, K.C.M.G., Governor of the Leeward Islands, said: 'The present prospects seemed somewhat brighter and he believed that if the support of his Majesty's Government could be secured at an early date so as to assist in providing the requisite modern machinery, the energy and business capacity of the planters of the island would enable them to compete successfully with their foreign rivals. He earnestly hoped it would be so.'

We are glad to learn that the subject of Central Factories has still more recently been brought forward at Antigua. We hope to recur to it later.

Onion and Cotton Seed.

Planters who are desirous of obtaining good seed of onions, or of Sea Island or Upland cotton, for next season's planting, are advised to communicate as soon as possible with the officers in charge of the Botanic Stations in each island, stating the quantity of seed they actually require. For their guidance it may be mentioned that 4 to 6 ℔. of onion seed are sufficient for an acre when sown in the open, and that the price of the seed imported direct from Teneriffe, is from three to four shillings per ℔. For cotton, seed at the rate of about 6 lb. per acre is required; the price will depend on the quality and quantity ordered. To prevent disappointment it is necessary that applications should be sent in as soon as possible, especially in the case of onion seed, as the supply from Teneriffe is limited. In past seasons many people have been unable to obtain the quantity required, owing to late application.

Milch Goats.

An effort is being made by the Imperial Department of Agriculture to introduce into the West Indies an improved breed of goats for milking purposes. A fine young ram goat of a special breed has recently been obtained from the stock so carefully selected for many years by the Baroness Burdett Coutts. The Honorary Secretary of the British Goat Society, who has kindly assisted the Department, advised the Crown Agents for the Colonies as follows:—

> 'As a goat has been obtained, I am glad to learn, from the Baroness Burdett Coutts, of the Anglo-Nubian variety, I would strongly suggest that the other be of the Toffenburg breed, a Swiss kind, which is to goats, in the manner of *quantity*, what the Jersey cow is amongst the bovine species in *quality*, of milk production. But this is a scarce breed in this country and specimens are obtainable with difficulty. I knew of one for sale a short time ago and will ascertain if it is disposed of. It is of the highest importance that the stock goats sent to Barbados should have a milking pedigree, that is, be descended from dams with a good milking record.'

The animal already to hand 'Black Rock' is hornless, jet black in colour and stands 33 inches high at the shoulder. He is entered in the Herd Book of the British Goat Society (No. 1011) as having been born on January 15, 1902.

For a previous note on 'Goat Keeping' see page 211 of Volume I of the *Agricultural News*.

The Work of Travelling Instructors.

Mr. George S. Hudson, the Agricultural Instructor at St. Lucia, contributes the following interesting information on the result of his work among cacao cultivators in that island:—

'On my recommendation the following planters have ordered about 50 tons basic slag to follow the scheme of manuring and cultivation practised on the Dennery Cacao Plot:— Messrs. E. DuBoulay, G. Laffitte, E. H. Edmunds, Wm. Low, W. P. Deacon, and A. H. Richard. £10 worth of manures are also being distributed to peasant proprietors by the Dennery Agricultural Society and applications for same are numerous. The manures will of course only be awarded where I am satisfied that forking, weeding and pruning are properly carried out. On January 12, I visited Wm. John, Mann Rose and Louis George, all peasant proprietors owning land near the Dennery Plot and spent some hours with each of them showing how their trees should be pruned, forked and manured, etc. Two years ago my first efforts to convert Wm. John were repulsed in a very ungracious manner, now he is only too willing to accept my services. Mann Rose has greatly improved his plantation under my instructions last year. I have invitations to visit six or seven other planters at Dennery which I shall shortly avail myself of. I have also similar work booked at Soufrière which will occupy me a fortnight next month.

Royal Danish West Indian Commission.

Subsequent to the rejection of the treaty for the sale of the Danish West Indian islands to the United States, a Royal Commission has been appointed to visit the Danish Colonies in the West Indies and to report on their resources and prospects. According to the Barbados *Advocate*, the members of the Commission, who arrived in R.M.S. *Para* on the 18th. instant, are as follows:— Herr Nordlien, K.D., Chief of Public Works; Judge Rosenstand who was for many years at St. Thomas; Chamberlain Scavenius, formerly Secretary of State; J. J. Jensen, member of the Folkething and a large landed proprietor; Dr. Rothe, former editor in chief of the *Berliengyste Tidende;* Captain Ramsing, of the Royal Engineers; Magister Borgensen, a well-known scientist who has already visited these parts with Professor Warming's expedition; Counsel General Andersen, Councillor of State and Director of the Danish Asiatic Steamship Company, and Admiral Richliew, Director United Steamship Company of Denmark.

At the request of the Secretary of State for the Colonies, the Imperial Department of Agriculture has communicated with the President and expressed its readiness to assist the Commission and to furnish the members with copies of official and other publications.

Long-foot Cabbage.

A very hardy, acclimatized, variety of the common cabbage is found occasionally in the West Indies, chiefly in negro provision grounds. It has bright green leaves, without the glaucous bloom usually found on some cabbages. It will thrive anywhere and is evidently well suited to dry, arid conditions where no other kind of cabbage will grow. The negro name of 'Long-foot' at once suggested that it was not unlikely to be closely related to the cabbage grown in the Channel Islands and in the Canary Islands for the purpose of making walking sticks from its stems. This is evidently the case. The growth of the stem is promoted by constantly stripping off the lower leaves. Some specimens have been known to attain a height of 10 feet. The 'Long-foot cabbage' may, however, have other uses, and that is to supply green food for man and beast in times of scarcity. We therefore commend this hardy, and apparently neglected vegetable, to the attention of those living in remote and arid localities. It is easily propagated by cuttings. These might be obtained, preferably in exchange for other plants, from the Agricultural Instructor at Montserrat.

Chemical selection of Sugar-cane.

Mr. Sydney Buxton, M.P., the other day asked Mr. A. Chamberlain, as representing the Colonial Secretary, whether the Colonial Office would present to Parliament a prècis of the information collected and published by the Imperial Department of Agriculture for the West Indies, relating to experiments with varieties of sugar-cane, and to the chemical selection of sugar-cane. The reply was to the effect that pamphlets giving summaries of the reports referred to by the honorary member are published by the Imperial Department of Agriculture for the West Indies, and can be purchased at Messrs. Dulau & Co's, 33, Soho Square, for a few pence. It would therefore seem hardly worth while to publish them separately for Parliament. The question of whether these and similar publications cannot be made more widely known is under consideration. *(Pharmaceutical Journal,* December 27, 1902.)

Barbados Local Exhibition.

The local Exhibition held in Barbados on January 13 at Todd's plantation, St. John's, was as announced in our last issue, a complete success in spite of adverse weather. The exhibits were numerous in all the classes, and on the whole of a high order of merit.

The most marked advance was seen in the plants from school childrens' gardens. Last year, owing apparently to the novelty of the subject, the exhibits in this class were comparatively few, and only six were deemed of sufficient merit to receive prizes. This year nearly 200 plants were shown, from thirteen schools, and forty prizes were awarded.

The show of stock was fairly satisfactory, but capable of improvement. The root crops, for which the conditions in Barbados are so well suited, were of excellent quality.

Amongst other exhibits of special merit were some excellent oranges, some very fine pink-fleshed grape fruit, and good locally-grown tobacco.

Manuring Canes in the Leeward Islands.

The following extract is taken from the Hon'ble Francis Watts' report on *Sugar-cane Experiments in the Leeward Islands,* Part II. :—

'The results of this year's experiments confirm the opinion expressed in the report for last season, that it is possible to grow good crops of plant canes with the use of pen manure only, including in the term pen manure such manurings as 'green dressings,' 'bushings' and the like. When these manures can be obtained in sufficient quantity there is no need to employ artificial manures, and their employment will probably result in financial loss.

'When the fields are in good condition as regards tilth, but pen manure is not obtainable, artificial manures may prove remunerative, but, as the results at Parham New Work show, are sometimes unnecessary. For this purpose the artificial manures should convey to the soil about 40 ℔. of nitrogen, 40 ℔. to 60 ℔. of potash, and 20 ℔. to 40 ℔. of phosphoric acid. These constituents will be contained in 200 ℔. sulphate of ammonia, 80 ℔. to 120 ℔. sulphate of potash, 130 ℔. to 260 ℔. of basic phosphate, or 120 ℔. to 240 ℔. of superphosphate.'

It must be distinctly borne in mind that this opinion is founded on the results of experiments carried on in the Leeward Islands and should be taken as applying to the Leeward Islands only.

INSECT NOTES.

The Mango Shield Scale.

Among the most common scale insect now found in the West Indies is the Mango Shield Scale *(Lecanium mangiferae).* This species was originally described by Mr. E. E. Green from Ceylon and has evidently found its way to the West Indies on imported plants, very possibly on the mango itself. At the present time it is found throughout the Lesser Antilles, and also in British Guiana, Trinidad and Jamaica. It is interesting to note that this species does not occur so generally as do some others; it does not appear to be known from the United States or from Porto Rico, nor has it been recorded from Europe as have so many of our introduced species.

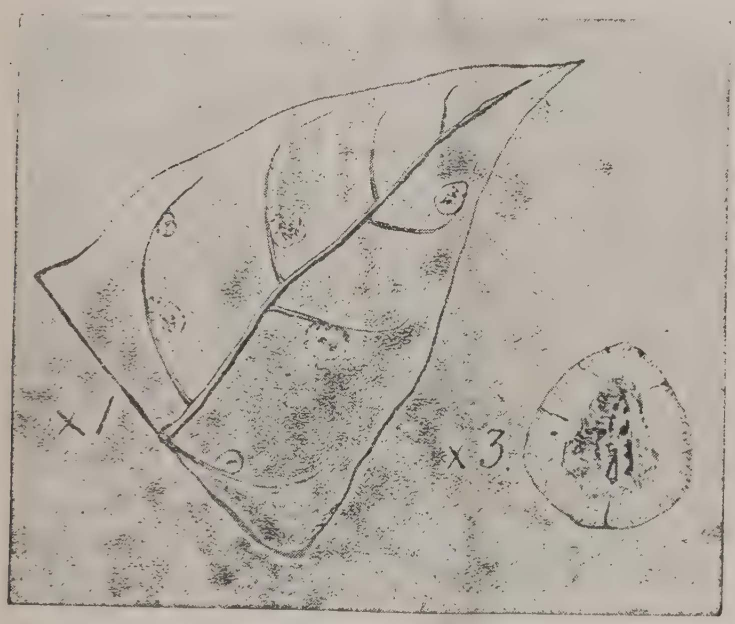


Fig. 5. The Mango Shield Scale.

Magnified 1½ and 4½ times, and not as marked in the illustration.

The mango shield scale is now well established in these islands, not only on mango, but also on sapodilla, allamanda, custard-apple, breadfruit, star-apple, star-plum, Java plum, rose-apple, mammee apple, nutmeg, and other plants of lesser importance. It may almost be characterized as a fruit tree pest, and for this reason should be familiar to all who grow West Indian fruit trees other than the varieties of citrus. In itself it is not as destructive as such pests as the Small Snow Scale, the Bourbon Aspidiotus, or the various scales on citrus plants, but owing to the constant occurrence of black blight on trees affected with this scale, it becomes of considerable importance. At the present time, the outbreak of black blight on mango and other trees at Grenada is largely due to this scale insect, and the general occurrence of black blight on mango and other fruit trees of these islands is mainly caused by the presence of mango shield scale. As has so frequently been pointed out, the treatment of black blight resolves itself into the question of destroying the primary cause, the scale insect. To this end, reliance must at present be placed mainly on spraying. The chief natural check on this scale is a fungoid disease which becomes evident as a white mould on and round the dead insects. As the black blight persists some time after the death of the scales, and as the fungus only appears to spread in wet weather, this check is not very effective, and it is wiser to rely on spraying and on the measures recommended for general adoption in Grenada (see p. 37). A fuller account of this and other important scale insects is to be found in the pamphlet *Scale Insects of the Lesser Antilles, Part I.* Some knowledge of scale insects generally, and of our destructive species in particular, is sufficient to make the destruction of these pests far simpler than would at first sight appear, and every one interested in fruit trees or gardening should have at least this knowledge. Like other pests, these yield to treatment very readily, and the general misconceptions as to the 'Blights' and their causes go far to hinder the adoption of the simple remedies which are found effective in dealing with them.

Sale of Honey in the American Market.

We reproduce below the *pro forma* account sale received from Messrs. Gillespie Bros. & Co., of New York, mentioned in their letter which appeared in the *Agricultural News,* Vol. II, page 25 :—

Pro Forma Account Sales of Honey ex s.s.———— received December 1902 by Gillespie Bros. & Co., and sold for account of whom it may concern.

I. D. A. 50 casks Honey		
1,608 Am. gallons gross		
143½ out		
Net 1,464½ Am.gallons @ 66c.		$966.57
CHARGES.		
Freight say on 20,000 ℔. @ 30c. 100 60 – + 5% – ... ... 3 –	63.00	
Customs Entry	2.50	
Duty say on 1,460 gallons @ 20c. ...	292.00	
Lighterage		
Weighing and Taring Sampling and Testing } Gauging ...	5.00	
15/20 each Cartage incurred sometimes ; in dull markets		
Wharfage? If incurred 10c. each		
Storage and Labour		
Cooperage (or mending) (varies) ...	5.50	
Marine Insurance $544 @ $\frac{5}{8}$%	3.40	
Fire Insurance	.97	
Brokerage 1%	9.67	
360 Interest on Charges 20d.	1.20	
Commission 2½%	24.16	407.40
Rate £ Net Proceeds due January, 1903		$559.17

Net say 38⅕cents per American Gallon.

80 Imperial gallons equal 96 American gallons.

E. & O. E.

New York.

CANADA AND THE WEST INDIES.

TORONTO EXHIBITION 1902.

A GOLD MEDAL FOR THE WEST INDIES.

Readers of the *Agricultural News* are already well acquainted with the considerable interest that was taken last year in all parts of the West Indies in order that the staple productions of these colonies might be promiently brought under the notice of their fellow-subjects in the Dominion of Canada. The object in view was to bring about closer business relations between these two groups of British Colonies that are geographically so well situated for a mutual interchange of commodities.

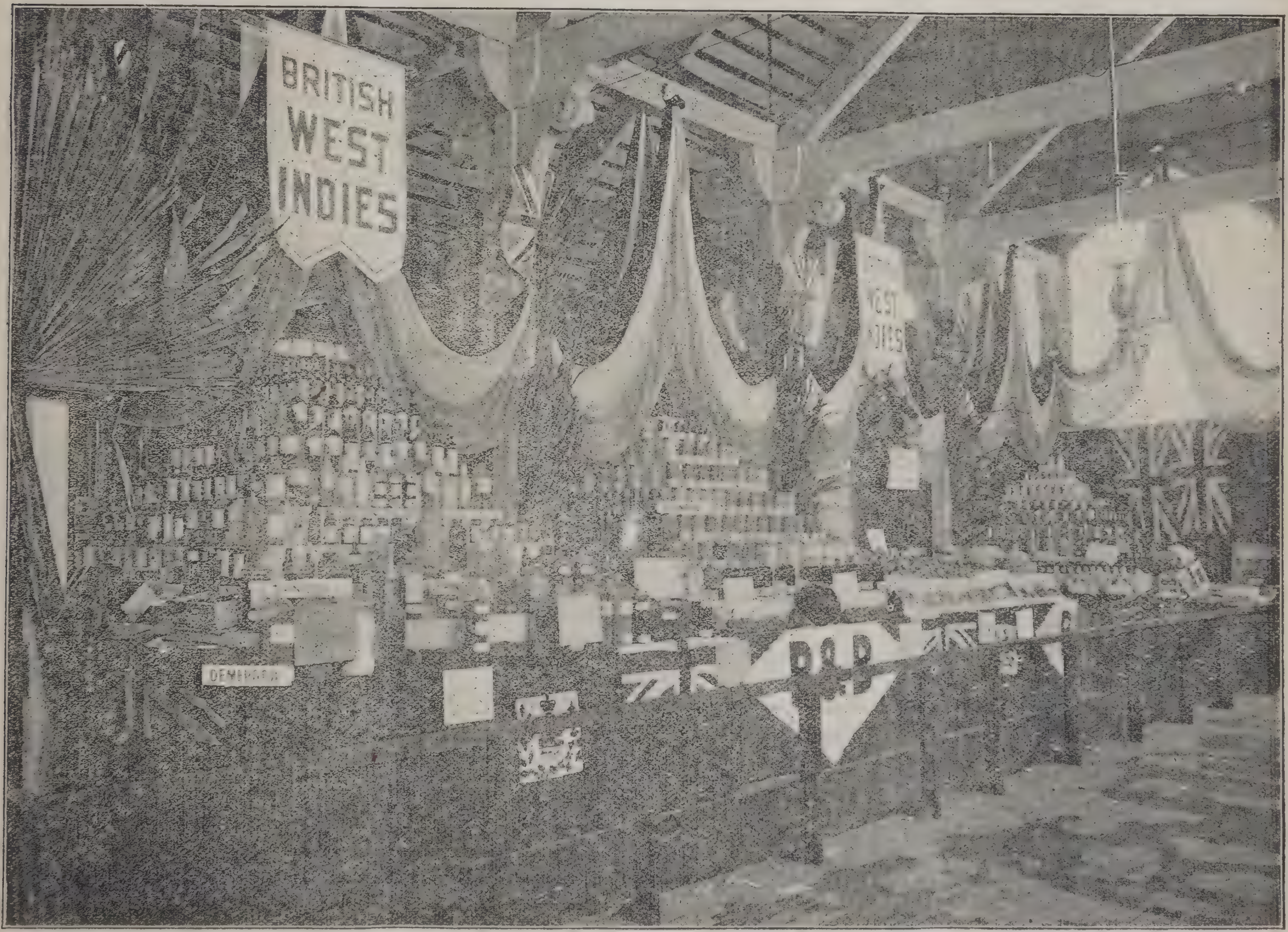


FIG. 6. WEST INDIAN COURT AT THE TORONTO EXHIBITION, 1902.

The larger colonies such as Jamaica, British Guiana and Trinidad were well represented, but, in addition, excellent exhibits were forwarded from the Windward and Leeward Islands and Barbados.

We publish to-day a photograph of the West Indian Court at the Toronto Exhibition. This will sufficiently indicate the successful manner in which the exhibits were arranged and displayed by Messrs. Pickford & Black. The members of this firm bore the entire cost of conveying the exhibits from the West Indies to Toronto and largely, also, that of fitting up the Court and arranging the exhibits.

The fact that the West Indian Court received the highest award, viz., the Gold Medal of the Exhibition, is a convincing proof of the success which attended the joint efforts of these colonies, as also, of our friends in Canada.

Speaking at a recent meeting of the Agricultural Society at St. Lucia, Dr. Morris stated that, thanks to the personal efforts of Mr. Charles Pickford who took entire charge of, and arranged the West Indian exhibits, that section of the Toronto Exhibition was most attractive. All the colonies, large and small, were prominently brought forward. He was at Toronto himself and prominent Canadians assured him that the West Indian exhibits were greatly appreciated and excited a good deal of interest. Amongst the people of Canada there were still many who knew little or nothing of the West Indies. In the endeavour to remedy this, the Imperial Department of Agriculture arranged to distribute 20,000 copies of a special pamphlet and other literature giving information about these colonies. It is estimated that over 200,000 people visited the Exhibition. As one result it is anticipated that a larger number of Canadians will be induced to visit the West Indies during this winter on business as well as pleasure.

So far from slacking in interest in regard to the Toronto and other Exhibitions, Dr. Morris was strongly of opinion that during 1903 still greater efforts should be made to bring the West Indies into closer relations with Canada. Each country was the complement of the other and their productions were mutually interchangeable. There were four Exhibitions held every year in the Dominion of Canada. Two of these went on simultaneously. It would be desirable for the West Indies to prepare a duplicate set of sample products—viz., those that could be produced in commercial quantities and not mere curios—so that they could be exhibited at all four Shows. Afterwards they could be distributed to the Chambers of Commerce and find their way all over Canada. During 1903, with the permission of the Secretary of State, he proposed to appoint a capable representative to attend these Shows and give, at first hand, all information about West Indian products and distribute literature whereby they might become better known.

In support of the remarks made by Dr. Morris, Mr. H. B. Murray, the Manager of the Colonial Bank at St. Lucia addressed the following letter to the *Voice of St. Lucia*, published December 25, 1902:—

May I be allowed to add my testimony to that of Dr. Morris as to the immense amount of gratuitous labour so cheerfully performed by Mr. Charles Pickford (of the firm of Pickford and Black) on behalf of the West Indian exhibitors at the Toronto Exhibition. I was at the Exhibition for hours, nearly every day of the week that it was open, and Mr. Pickford not only secured an excellent site, near the entrance of the grounds and in the same annexe as the North-West Province of Canada (whose exhibits were in striking contrast to ours, representing an absolutely different country and climate), but great care had been taken to arrange our various products in their most attractive form, and both Mr. Pickford and his assistants were deluged with questions by all sorts and conditions of men as to the use of this or that article, and were courtesy itself in their efforts to interest visitors in the West Indies and their products. Mr. Pickford also had an *Address Book* handy where any and every visitor who wished to get into touch with any of the colonies, wrote his name and address. Some beautiful photographs of the volcanic effects at St. Vincent and Martinique, which he exhibited, always had a crowd round them—and speaking of a crowd—the night before the Exhibition closed we remained to see the gorgeous fireworks that formed a part of the entertainment, and, as a result, had to struggle through a crowd of eighty thousand people all making for the electric tram cars at the same moment—an experience we are not likely to forget.

DISPOSAL OF MANURE.

The following is an extract from a paper read by the Rev. Dr. Morton, at a meeting of the Trinidad Agricultural Society, held on January 13.

The exposing of so-called waste substances to the weather is a first-class misdemeanour, for by evaporation and excessive fermentation in dry weather and by washing-out under rains the best elements of the manure are wasted and the air thereby rendered impure. All such substances should be kept under cover.

The liquid direct from the stall or washed out of the heap is the most valuable part of the manure and when left to decompose the most dangerous to health.

The liquid should be collected in a concrete well and thrown over the solids to prevent excessive fermentation and to render them of increased value as a fertilizer.

The contents of such a shed should be removed at least once a week But they can be kept for that time with less danger to health than a pile of manure left in the weather will become in only two or three days, for in point of fact you never can gather up the dangerous elements washed into the soil.

Covered manured never gets sloppy and does not produce water itch on those who remove it as exposed manure does.

It will pay for cartage and railage, for it is at least of double value to the soil.

PRESERVING BOOKS IN THE TROPICS.

At the request of a correspondent, we reproduce from Pamphlet No. 5, of the Department Series on the *General Treatment of Insect Pests*, (Second Edition), p. 27, the following hints for preserving books from insect pests in the tropics. (See also *Agricultural News*, Vol. I, p. 140.)

The books should be lightly painted over by means of a camel's-hair brush, both outside and inside the covers (and especially along the margins and backs where paste has been used), with a mixture as follows:—

1 oz. Corrosive sublimate.
1 oz. Carbolic acid.
2 pints Methylated, or white rum spirit.

This solution (if carefully applied) will effectually preserve books with either paper, cloth or leather covers from cockroaches and other insects. No harm will be done to the books, and after the mixture has dried they may be handled with perfect safety.

Every new book received should be at once treated in this manner. The result will be that they will keep in as good order in the tropics as in temperate climates.

Book-binders in the tropics are recommended to use a paste poisoned by adding half an ounce of copper sulphate (or blue stone) to every pound of paste.

Mason Bees and Mason Wasps.

In the account of the British Guiana Maribunta in the *Agricultural News*, Vol. II, p. 24, it was stated that it was the 'mason bee' which brings in large numbers of caterpillars. In commenting on this, we drew attention to the fact that in Barbados it is a 'mason wasp' that does this.

Mr. J. T. Thorne now writes that he 'inadvertently used the creole word "mason bee"; as it certainly is a wasp, black with yellow bands, and not a bee.'

BIRD NOTES.

The American Rice Bunting or Rice Bird, also known as the 'Bob-o-link' *(Dolichonyx oryzivorus)* is a regular winter migrant to the West Indies. A specimen of this bird was recently obtained at Barbados. Another well-known migrant captured at the same time was the Two-penny Chick *(Porzana carolina).* This is classed as a Rail, and when flushed from a swamp and driven to seek refuge in a dry place, it has the singular habit, according to Colonel Feilden, of running into holes or poking its head ostrich-like, under cover, and in this situation it has been captured by hand. Both the above birds were named at the British Museum (Natural History) South Kensington.

A fine specimen cf the Tropic bird *(Phaeton æthereus)* was picked up on board *s.s. Dahome* during a violent thunder storm, between Barbados and St. Vincent, on December 17 last. It had evidently been driven with some force against the rigging as it had one of its wings injured. Otherwise it was in excellent condition. It was presented by Captain Leukten to Dr. Morris who happened to be a passenger on the *Dahome* on his way to Grenada. The Tropic bird is about the size of a partridge with very long wings, the bill is red, the eyes are surrounded with black lines, the rest of the bird is white except the back, which is variegated with black wavy lines. The tail consists of two very long, straight, narrow feathers, easily distinguishing it from any other bird. This is sometimes, but erroneously, called 'Boatsman bird' and 'Booby.' It is said to breed in the neighbourhood of Grenada where, in allusion to its tail, it is known as *Paille-en-queue.*

Stump Grubbing Machine.

Few problems present greater difficulties in the clearing of second growth lands in these islands than that of removing the many small stumps and roots, which are left in the ground after felling and burning. In America and other places the difficulty is overcome by the use of an ingenious and simple apparatus, known as a 'grubbing machine' or 'stump puller.' This most useful implement easily removes small stumps and saplings and thoroughly exterminates them. It is claimed that one man, with a machine of this description, can do the work of five men with grubbing hoes.

Quite recently a grubbing machine was imported from America for use at the Agricultural School in St. Lucia, and tried on a field of newly cleared guava scrub land. As operators, two of the boys of the school (lads of about fifteen years old) were employed. Very satisfactory results were obtained. The removal of fair-sized stumps was found to be an easy task for boys of this age, who soon began to regard the work as an agreeable pastime. The grubbers referred to can be procured from any agricultural implement dealer in the United States. Those in use at St. Lucia were obtained from Messrs. Peter Henderson & Co., 35 & 37 Cortlandt Street, New York, who supply them in three sizes at $5.50, $6.50, and $8.00 respectively.

METHODS OF DUTCH ONION GROWERS.

Recently English onion-growers are complaining that they were suffering from the competition of their Dutch and Belgium neighbours and they suggested that the Dutch producers enjoyed exceptional advantages in the way of cheap labour, low freight and Government subsidies. The Board of Agriculture has published a report by Mr. R. F. Crawford, who visited Holland to investigate Dutch methods. Some of the points in this report will probably be of interest to onion-growers in the West Indies.

Mr. Crawford states that Dutch organization enables consignments to be sent to England of greater uniformity of size, shape and colour than is attained by English growers, and that consequently, Dutch onions fetch a better price in the market.

A point in which the Dutch have an advantage over the English gardeners is in the formation of co-operative societies. The Society supervises the quality, quantity and packing of the produce, holds auction sales, exports goods of first-rate quality to foreign markets and, generally, takes any steps which will further the disposal of the crops. There is a Committee whose duty it is to see that the onions are properly packed and that the articles are sound and of good quality throughout, in which case the trade mark of the Society is affixed. In one case a Society posts a 'Black list' in a conspicious position and in this list are inscribed the names of those members who attempt to pass inferior produce.

FORTHCOMING AGRICULTURAL SHOWS.

Antigua :—The Agricultural and Commercial Society have arranged an exhibition for February. The actual date is not yet announced.

Berbice :—An Agricultural Exhibition is announced for February 18, 19, 20.

Dominica :—An Agricultural Show will be held at the Court House, Roseau, on February 11 and 12.

Grenada :—A District Agricultural Show will be held at Mount Rich estate, St. Patrick's Parish, on April 1 and 2.

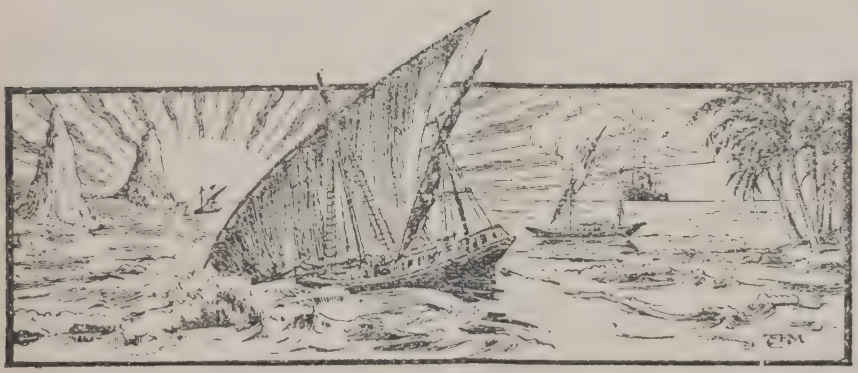
St. Lucia :— A show of Agricultural Produce is announced to be held at the Union Agricultural School on Friday, March 27, by the St. Lucia Agricultural Society.

Jamaica :—As already announced, a Horse Show will be held at Hope, near Kingston, on February 11 and 12. Five silver cups and over £200 in prizes are being offered for competition.

BAY WOOD.

An inquiry was recently made of the Department as to the tree which yields the timber known in the United States as Bay wood. The countries of export are stated to be mainly Mexico and Honduras. It was noted that this wood differs considerably from mahogany, being much lighter, softer and without the characteristic grain of the latter. So far as is known the term 'Bay wood' is applied in British Honduras to an inferior variety of Mahogany *(Swietenia mahagoni),* which, growing in somewhat moist lands, is of rapid growth, and its timber is consequently porous and loose in texture. The name 'Bay wood' perhaps owes its origin to the fact of the trees growing on lands bordering the Bay of Honduras. A similar usage may be traced in the local name 'bay men' for the people living on the shore of the bay.

We would be very glad of any further information on this subject from our readers.



GLEANINGS.

The King's Birthday, November 9, has been officially proclaimed as 'Arbor Day' at St. Lucia.

The following breeds of fowls are now kept at the Agricultural School, Dominica :— Black Orpingtons, White Leghorns, Plymouth Rocks. Eggs for setting can be purchased at three pence each.

At the meeting of the Antigua Agricultural & Commercial Society on December 5, the Hon'ble Francis Watts read a paper entitled 'Brief notes on Fungi. What they are and how they grow.' We hope to publish portions of this paper in a future number of the *Agricultural News.*

Attention has already been drawn to the ornamental character of *Spathodea campanulata* (see *A. N.* II. p. 28). In a recently issued work on the medicinal plants of the Soudan, it is stated that the powdered root of this plant is used for a skin disease known as 'niama'.

On account of the revolution in Venezuela and the blockade by the British and German warships very little coffee has been coming to Trinidad from the Mainland. This has been taken advantage of in Jamaica, whence planters have been sending by the direct Royal Mail service some fine lots of coffee which have been sold at six to seven cents a pound. It is worthy of note that whereas Trinidad admits coffee free, Jamaica charges an import duty of $4.80 per hundred pounds on foreign coffee. (Trinidad *Mirror.*)

The Commissioner of Montserrat (Mr. F. H. Watkins) proposes to invite twenty representative small owners to visit the Grove Experiment Station in that island in order to explain the objects in view and interest them thoroughly in the work carried on there. The older children in the elementary schools will also be invited, occasionally, to visit the Station in company with their teachers. This is an excellent plan and deserves to be followed elsewhere.

At the forthcoming Agricultural Show at Dominica four special prizes for baskets of English vegetables are offered to boys attending the Agricultural and Elementary Schools. Five prizes will be given for bananas suitable for export, and Messrs. Rowntree & Co. offer two prizes for not less than 14 ℔. of cured cacao exhibited by peasant proprietors.

Mr. J. H. Hart records that a cacao tree growing by the kitchen of his residence at the Botanic Gardens, Trinidad, has yielded a crop of seventy pods at one picking. This at ten pods to the pound (a very liberal estimate) would give 7 ℔ of dried cacao. The principal manures given were kitchen sweepings and wood ashes. Mr. Hart considers it probable that during 1903 fully double this yield will be realized.

A very fine plant of *Corypha umbraculifera*, the celebrated Talipot palm of Ceylon, is now in fruit in the gardens of Government House, Georgetown, Demerara. Mr. J. F. Waby reports that this specimen was planted out in 1881, being then some five or six years old. It now possesses a stem 50 to 60 feet high, crowned with a panicle 10 to 12 feet long, bearing an enormous crop of fruit. He states that this is the first plant of this species to fruit in Georgetown, and the second in the colony.

The export of balata from British Guiana shows, says the *Argosy*, in 1901, a most gratifying increase, to be ascribed principally to the fact that the virgin trees in the upper reaches of the rivers have been tapped. The industry is a remunerative one, but it is not without its risks, and it is probably due to this element that so few capitalists are engaged in its prosecution.

Those of our readers who happen to possess spare copies of the first number of the *Agricultural News*, would oblige by communicating them to the Curators of the Botanic Stations, who will be prepared to pay three pence each for them.

Possibly the first mention of an Agricultural Instructor, serving in the West Indies, is that of Mr. Charles Plummer, appointed Agricultural Instructor at the Caicos Islands in 1883. This officer was appointed on the recommendation of the Commissioner of the Turks and Caicos Islands, now Sir Robert Llewelyn, K.C.M.G., who has always been sympathetic in regard to agricultural development in the colonies under his charge. Since he has been Governor-in-Chief of the Windward Islands he has been the means of securing the appointment of Agricultural Instructors at St. Vincent and Grenada, both maintained from colonial funds. This is a practical form of co-operation with the work of the Imperial Department of Agriculture that is very gratifying.

In the *Agricultural News*, Vol. I, p. 167, mention was made of the naturalizing, since 1840, of the English hare at Barbados, where it is still fairly abundant. A pair has recently been presented to the Imperial Department of Agriculture. It is intended to forward these to the Zoological Gardens in London, in order that a comparison may be instituted between the Barbados specimens, after 62 years' existence in the tropics, and the original British stock.

At the Berbice Agricultural Exhibition to be held on February 18 to 20, his Excellency the Governor has offered a prize of $50 for the best specimen of good, merchantable, clean Para rubber, over 112 ℔. in weight. The rubber must be the product and manufacture of the colony, and should be accompanied by leaves, flowers and fruit of the tree from which it has been obtained.

The new crops of onions in Barbados are, in some cases, affected by a small pale-yellow thrips. This causes the leaves to shrivel and look sickly, also to cover them with whitish specks, the cast-off skins of the mites in their early stages. The only effective cure is to spray the plants at once with whale oil soap or kerosene emulsion. This should be done early in the morning or late in the afternoon and in dry weather if possible.

EDUCATIONAL.

Lectures to Teachers at Barbados.

The third of the Series of Lectures in Agriculture organized for the teachers of Elementary Schools at Barbados was delivered by Dr. Longfield Smith at Harrison College on Saturday the 24th. instant. Thirty teachers were present.

At the close Dr. Morris addressed a few words to the teachers, and added :—

If I were asked what objects these lectures to the teachers of Elementary Schools at Barbados are intended to serve, I would reply that they have been organized by the Imperial Department of Agriculture with the view of enabling the teachers to bring home to the children (as well as to their parents) a perception of the extensive field that a knowledge of the rearing and tending of plants and animals opens up to them ; so as to lay a wide foundation for the creation of a capable and intelligent labouring population for the cultivation of staple crops and of a self-respecting and prosperous peasant community.

Leeward Islands.

In the Annual Report on the Education Department, Mr. C. M. Martin, the Inspector of Schools for the Leeward Islands, says :—

During the past two years two courses of lectures on subjects connected with agriculture have been delivered in each of the Presidencies by officers of the Imperial Department of Agriculture. During the year under review an excellent text-book on *Nature Teaching* by the Hon'ble F. Watts has been published. So far as mere knowledge is concerned, most of the teachers are fairly competent to undertake instruction in agriculture, or rather in subjects which bear upon the principles which underlie agricultural methods.

I take this opportunity of expressing my gratitude to the Imperial Department of Agriculture for what it has done on behalf of the schools of the colony. Its assistance, both in instituting courses of lectures to teachers and in supplying tools for the school gardens has been invaluable, and it is not too much to say that, without its aid, the introduction of this all-important subject must have been indefinitely postponed.

Agricultural Instruction in the Leeward Islands.

The following Rules regulating the Grants for Agricultural Instruction in Elementary schools were published recently by the Government of the colony :—

1. A Grant of £1 or £2 will be made to the teacher of each school in which efficient instruction in subjects bearing on Agriculture is given in accordance with the provisions of the Education Code in force.
2. In order to earn a Grant the Inspector of Schools must be satisfied that the work has been continuous throughout the year, that all the instruction as required by the Code has been given and that the subject has been taught experimentally, *i.e.*, the pupils of all standards above the fourth have been trained in box or pot culture, and the lessons to the standards below the fifth have been illustrated by suitable diagrams and actual specimens. But no grant will be made in any case unless there is evidence that the teaching of the subject has aroused an intelligent interest in the minds of the pupils.
3. The Inspector of Schools will supply out of the sum voted for the purpose of Agricultural Instruction the necessary materials for box or pot culture.
4. A limited number of school gardens will be established in each Presidency and a further Grant of £1 or £2 will be made to the teacher of the school to which the garden is attached, if the Inspector of Schools is satisfied that the character of the work done merits a Grant. The course of work in the school garden will include the laying out of beds, the rasing of plants, transplanting, the care and culture of garden crops, grafting and budding. In the case of Schools the gardens of which are not attached to Botanic Stations, or are not under the direction of officers of the Imperial Department of Agriculture, the course of work laid down in *Hints for School Gardens*, No. 11 of Pamphlet Series published by the Imperial Department of Agriculture, must be followed out.
5. No Grant will be made on account of a School garden unless there is a proper title to the land and unless the ground is properly fenced and there is a sufficient water supply.
6. The Inspector of Schools will supply the tools necessary for the working of the authorized School Gardens and such tools shall be and remain the property of the Government.
7. Applications for admission on the list of Schools authorized to establish gardens must be made to the Inspector of Schools not later than March 1, in each year.

DEPARTMENT NEWS.

At a special meeting of the Barbados Agricultural Society proposed to be held at the Planters' Hall on Friday, February 6, Dr. D. Morris, C.M.G., the Commissioner of Agriculture for the West Indies, has consented to give an address in which he will embody some of the results of his recent visit to the United States, Canada and Bermuda and discuss the conditions necessary to establish the cultivation of cotton and onions in the island.

Mr. Harold A. Tempany, B.Sc., (Lond.) has been appointed by the Secretary of State for the Colonies, Assistant to the Government Analyst and Agricultural Chemist for the Leeward Islands in connection with the Imperial Department of Agriculture for the West Indies.

Mr. Tempany was expected to leave England on January 21, and to arrive at Antigua by the mail steamer due at that island on February 5.

BARBADOS.

The following interesting sketch of Barbados was written by Dora Alleyne, the youngest daughter of the Hon'ble Forster M. Alleyne of Porters, a pupil at St. Leonard's School, St. Andrew's, Fife. It was written as a school exercise and with no idea of being published. It is reproduced (by permission) in the pages of the *Agricultural News* as it contains a singularly clear account of the reaping of canes and the manufacture of sugar in this island:—

I shall only be able to tell you from my own experience about Barbados, which, although one of the smallest of the West Indian islands, being exactly the size of the Isle of Wight, nevertheless thinks itself very important, because it is the oldest British colony,[1] and the only one of these islands which has never changed hands. It is also one of the most densely populated spots in the world. It is the first island that you touch at coming out from England, having seen no land since you passed the Lizard thirteen days before. As soon as the steamer anchors in Carlisle Bay, she is immediately surrounded by a crowd of noisy negro boys, who come out in little canoes; they dive in a marvellous way for cents, which are easily seen in the clear blue water. They can stay under the water some time, and can swim like fish.

Now I'm going home, I should like you to come with me for a little while.

We drive through the noisy streets of Bridgetown, which are crowded with carts loaded with barrels of sugar, drawn by teams of mules or oxen. If we stop for a moment we are beset by negro-women with large trays of fruit, bananas, oranges, pine-apples, guavas and limes, on their heads, so heavy that two men can hardly lift them.

Once out of the town, we go along the hard, glaring-white roads with cane-fields on the one side, and the intensely blue sea on the other, with Manchineel trees growing actually out of the sand. These trees are most deceptive, as they bear a fruit which an Englishman might think is a harmless little crab-apple, but if he were to bite one it would blister his mouth terribly, and woe betide the man who takes shelter from a shower beneath a manchineel, as a drop from the leaves is enough to raise a blister on his skin.

After a drive of eight miles, it is delightful to turn into the shade of our avenue, which is almost the only remains of the forest which used to cover the island, as it has all been cut down for the cultivation of sugar-canes.

The trees are mostly mahogany, and there is a gigantic evergreen[2] which was blown down across the gully in the hurricane of 1831, and now has roots on either side. Here live the monkeys of which we are immensely proud, as they are the sole survivors of their race in the island;[3] although we were never quite sure if we should consider it a compliment when people informed us that they were bringing their friends up to see 'the monkeys at Porters', which is the name of our house. Long ago before monkeys had got so scarce, a man was sent out to shoot one as a warning, because they had been doing so much mischief in stealing the canes, of which they are very fond. When the master asked the negro if he had done it, he replied 'No massa, couldn't do it, him too much like me bruder'!

The garden is very different from an English one, as there are no pretty small flowers, but only great flowering shrubs and trees, and gaudy crotons in every shade of red and yellow. These are all very handsome, but one gets rather tired of them, and we try to grow seeds from England, but just as we think they are coming on nicely, down comes a tropical rain to wash them away; or, equally fatal, there comes week after week of drought, and that is the end of our efforts. One of the prettiest flowers is the changeable rose,[4] which begins by being pure white in the morning, and gradually turns pinker through the day, till by evening it is a deep rose colour, when it dies.

The tennis lawns are kept in very good condition, as they are in constant use, as we have summer all the year round, but we cannot begin to play before 4 in the afternoon on account of heat, nor after 6 as it gets suddenly dark. It is a very heating pastime, although we have little black boys to pick up the balls.

We have a small golf-course, but this game too, is carried on under difficulties, because after a drought there are such deep cracks in the field, that balls drop into. Although we can see them we cannot get them out.

Near by, the cane-fields begin, stretching away on every side. A sugar-cane is like a bamboo, about 3 inches round, and with a tuft of green rush-like leaves at the top, growing altogether to about the height of 6 to 10 feet. For the new crop, pieces of the stem are cut off and planted two together in holes about 6 ft. apart. Crop time begins about March, when the canes are cut down, the tops are cut off for the cattle to eat, and the canes themselves are carted to the mill where they are put through two great rollers, and the juice runs into troughs to be boiled. The crushed canes, which are now called megass, are spread out in the sun to dry, and then used as fuel for the boiler. The juice, which passes through the troughs into the boiling-house, goes through various stages of cleaning, boiling all the time. It is then run into coolers, where it remains for a few days to harden, and is then dug out with spades, and put into hogsheads, bored to allow the molasses to run into the molasses cistern. After about three weeks the sugar is carted into Bridgetown to be exported, and the molasses also. The negroes who work on the estates live in little wooden huts along the roadsides, which consist of two rooms only. They never have the windows open at night as they are terrified of catching cold, and if they see you out without a hat, they say, 'Hey-hey, you going catch a cole in you head, and you going dead, dead, dead, and your mammie going cry!' They eat wonderfully little, and will work from 7 in the morning till 12, without eating anything, and then they will just eat a little rice or a biscuit, and work on till 5 in the evening, and then they either have another frugal meal, or sometimes go without.

I wish I could make you see it as plainly as I do, and I think you would probably enjoy it as much as I did, and certainly some of the sunshine would be acceptable just now. But all the same I must confess that life in Barbados has its drawbacks.

---

(1) One of the oldest.
(2) Wild Fig.
(3) Originally from Africa.
(4) Hibiscus.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—January 6, 1903.—Messrs. J. Hales Caird & Co., Messrs. E. A de Pass & Co., 'The Gardeners' Chronicle,' January 3, and 'The Public Ledger,' January 3, 1903.

Aloes—Curaçoa, 14/6 to 40/-; Barbados 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 3*d.* to 5¾*d.* per lb.
Balata—No quotations.
Bees-wax—In steady demand at £8 to £8 5*s.* per cwt.
Cacao—T'dad, 58/- to 68/- per cwt. ; Jamaica 52/- to 57/- per cwt.
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 31/- to 64/- per cwt. Business restricted.
Cotton— West Indian $4\frac{13}{16}$*d.* to 5⅜*d.* per lb.
Fruit—
  Bananas—7/- to 10/- per bunch.
  Oranges—6/- to 12/- per case.
  Pines—2/- to 4/- each.
Fustic—£4 10*s.* to £4 15*s.* per ton.
Ginger—Jamaica, 34/- to 41/6- per cwt.
Honey—Jamaica 18/- to 22/- per cwt.
Kola Nuts—1*d.* to 4*d.* per lb.
Lime Juice—Raw, 9*d.* to 10½*d.* per gallon ; Concentrated, £12 per pipe.
Logwood—Jamaica, £4 2*s.* 6*d.* to £4 10*s.* per ton.
Mace—1/3 to 2/6 per lb.
Nitrate of Soda— Agricultural £9 5*s.* per ton.
Nutmegs—No public sales.
Pimento—2¼*d.* to 2½*d.* per lb.
Rum—Demerara 7*d.* to 10½*d.*, Jamaica 1/5 to 6/- per proof gallon.
Sugar—Muscovado 10/6 to 13/-. Crystallized 13/6 to 15/9 per cwt.
Sulphate of Ammonia—£11 15*s.* to £11 16*s.* 3*d.* per ton.

New York,—December 12, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, 80c. to 85c., eight hands, 60c.
Cacao—African, 12¾c. to 13c. ; Caracas, 13¾c. to 16½c. ; Jamaica, 10⅞c. to 11¼c., ; Grenada, 13⅜c. ; Trinidad 13c. to 14c. per lb.
Cocoa-nuts—Trinidads $15.00 to $17.00 ; Jamaicas $20.00 per M.
Coffee—Rio, good ordinary 5¼c. ; Jamaica, fair to good ordinary 6¾c. to 8c. per lb. ; Manchester grades 8½c. to 10½c. per lb.
Grape Fruit—$4.00 to $6.00 per barrel.
Oranges—$3.25 to $3.75 per barrel.
Pimento—4½c. per lb.
Rubber—Nicaragua scrap 60c. to 61c. per lb ; Guayaquil strip 55c. to 56c. per lb ; Esmeralda sausage 60c. to 61c. per lb.
Sugar—Muscovado, 89°, $3\frac{7}{16}$c. to 3½c. per lb. ; Centrifugals, 96°, 4c. to $4\frac{1}{32}$c. ; Molasses, 89°, $3\frac{3}{16}$c. to 3¼c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—January 17, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb. Market bare.
Cacao—Dominica $12.50 per 100 lb.
Coffee—Jamaica and ordinary Rio $8.50 to $9.50 per 100 lb. respectively.
Hay—New Brunswick, 85c. per 100 lb.
Manures—Nitrate of Soda $60.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $80.00 to $85.00 ; Sulphate of Potash $67.00 per ton. Sheep Manure $6.00 per ton.
Molasses—No quotations.
Onions—Madeira $5.00 ; White $3.50 per 100 lb.
Potatos—$1.15 to $1.30 per 100 lb.
Rice—Ballam $4.50 per bag (190 lb.) ; Patna $3.50 per (100 lb.) ; Rangoon $2.25 per (100 lb.)

British Guiana,—January 14, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $9.00 per barrel.
Balata—40c. to 42c. per lb.
Cacao—native 11c. to 13c. per lb.
Cassava Starch—$7.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11½c. to 12c. per lb. (retail.) Creole, 11c. to 12c. per lb.
  Dhal, $3.90 to $4.00 per bag of 168 lb.
Eddoes—$1.68 per barrel.
Onions—Retail 3½c. ; Garlic 7c. to 8c. per lb.
Pea Nuts—Curaçoa 4c. ; American 5c. per lb. (retail.)
Plantains—28c. to 40c. per bunch.
Potatos English—$2.75 to $3.00 per barrel.
Rice—Ballam $4.75 to $4.80, ex store ; Patna and Seeta $5.75 to $5.90 per bag.
  —Creole Rice 18c. per gallon.
Sweet Potatos—Barbados, $1.68 per barrel.
Tannias—$2.00 per bag.
Yams—$2.28 per bag.
Molasses—Vacuum Pan, yellow, 15c. to 16c. per gallon, casks included.
Sugar—Dark Crystals $2.02½ to $2.07½ ; Yellow $2.10 to $2.25 ; Molasses $1.40 to $1.60 (nominal) per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—Messrs. Gordon Grant & Co., January 15, 1903.

Balata—No quotations.
Cacao—Ordinary $12.50 ; Estates $12.75 to $13.25 per fanega.
Coffee—Venezuelan 6c. to 7c. per lb.
Onions—$3.50 to $4.00 per 100 lb.
Potatos English—$1.00 to $1.25 per 100 lb.
Rice—Yellow $4.50 to $4.65 ; White Table $5.25 to $5.75 per bag.

THE BEST MANURES FOR COLONIAL USE

— ARE —

Ohlendorff's Dissolved Peruvian Guano—For Sugar-cane and general use
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Ohlendorff's Special Cocoa Manure

Sulphate of Ammonia, Nitrate of Soda, Superphosphates, high grades, Potash Salts, Basic Slag and all other high-class Fertilizers.

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London Agency, 15, Leadenhall Street, London E.C.,
Barbados Agents: Messrs. James A. Lynch & Co., Bridgetown.

[33.]

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10*s.* per 100 or £4 per 1,000.

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10*s.* per 100 or £4 per 1,000.

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The above are choice plants thoroughly acclimatised to the tropics.

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Barbican, Halfway Tree,
Jamaica, B.W.I.

[23.]

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of Cotton on the same land with the same labor which now makes one.

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SEND NAME ON POST CARDS.

WILLIAM S. MYERS, Director,
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[26.]

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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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New Crops and New Pests.

AT the present time there is a general effort being made in the West Indies to introduce new plants for cultivation, chiefly as minor crops, subsidiary to the staple ones. Also with a view of testing the possibility of generally producing crops for which there is a demand in the world's markets. The introduction of a new crop not infrequently occasions the finding of new pests, and when the yield partially fails from the attack of insect pests, the first impression is, that the cultivation of this particular plant should be abandoned, at least on a large scale. This feeling should not, however, be allowed to weigh too strongly. The cultivation of any plant on a larger scale than usual, or the sudden introduction of any considerable area of a new plant, is practically certain to result in insect attacks. There is no more reason to be discouraged when this occurs than there is to think of abandoning sweet potato, or any other crop which is regularly and continually attacked.

When insect pests are found on a new crop, it does not necessarily follow that the pests have been introduced with the seed of those crops, but that the insects of that locality, finding a new plant growing in some abundance, will, when possible, live on that plant and the fact of there being a large supply of this plant on one spot tends to aid the increase of the insects. They then become pests, that is, organisms that increase beyond their normal limits and are injurious to an economically useful plant. There is in this nothing but what might be predicted from a careful study of nature; in fact the introduction of any new plant is always likely to be followed by its discovery as a food plant by various native insects which foregather and multiply upon it.

The wider cultivation of English potatos, onions and cotton in the West Indies has, recently, afforded examples of this process. The potato crop, wherever it has been tried in these islands, seems to have suffered from the attack of a small, black earwig which eats holes in the tubers below the surface of the ground. This insect occurs generally in these islands, feeding largely on decaying vegetation. It has readily taken to the English potato, and as it was, already, present in or near the fields, it attacked the potato wherever it was grown.

Cotton in Antigua has been attacked by a caterpillar, in St. Lucia by two scale insects, and in Barbados by an aphis (green fly). Had the insects of these localities been fully known, it might have been possible to predict each of these attacks. The scale insects in St. Lucia are those that attack *Hibiscus*, and the aphis in Barbados attacks ochro. Both these plants are very closely allied to the cotton and the same pests might reasonably be expected to occur on each. These pests will probably appear commonly where cotton is grown and may be looked for and at once dealt with.

Onions are suffering from the attacks of a moth in Antigua and Montserrat, and of a thrips in Barbados. It is not at present clear why these indigenous insects should be able to live on the onion, but a knowledge of their foodplants and life history would possibly show why they are able to adapt themselves to the onion. As, however there is a large area of onions in one spot (a feature rarely or never found in nature for any plant) the insects multiply enormously, owing to the abundance of food. 'Fore-warned is fore-armed' and we may reasonably look in every case for pests to appear on any newly introduced plant that is grown in any quantity. Amongst all the native insects struggling for food, some will probably be able to adapt themselves to the new plants, and, if they do the artificial conditions of our cultivation give them every assistance for rapid increase. Possibly, all would be glad to adapt themselves to new plants, grown in great abundance, as the struggle for food is probably acute. Fortunately insects are restricted as to suitable food and cannot suddenly make a great change in their diet. This point is worth bearing in mind and far from being discouraged planters should be prepared, beforehand, for the appearance of pests on new crops and deal effectively with them. If pests are expected as part of the regular routine of cultivation they are far less likely to be feared; and on the whole we should be thankful that the crops, new or old, are such as can afford food to only a few out of the great variety of insects that live around us on uncultivated and waste lands.

SUGAR INDUSTRY.

Sugar-cane Experiments at British Guiana.

A Report on the Agricultural work in the Botanic Gardens and the Government Laboratory, British Guiana, for the years 1896-1902 has recently been published. This document forms Part I of a comprehensive report on the experimental Agricultural work done in British Guiana under Professor J. B. Harrison, C.M.G., M.A., F.I.C., F.C.S. F.G.S., Government Chemist and the late Mr. Jenman, F.L.S., Government Botanist during 1896-1902. It is divided into chapters dealing with Meteorology, Old Varieties of Canes, Canes raised from Seed and Manurial Experiments.

METEOROLOGY.

From a comparison of the rainfall with the exports during the period under review, it is concluded that the crops of the colony are mainly dependent on the amount of rain which falls between December 1, in one year and October 1, in the succeeding, the best results with regard to sugar products having been as a rule obtained with rainfalls of 65 to 70 inches during these months. The total annual rainfall varied from 50 to 118 inches and the rainfall between December 1, and October 1, varied from 56 to 99 inches in different years. 'On the whole the weather conditions during the period 1896 to 1901 were most unfavourable for agricultural research work in the field.'

EXTENSION OF WORK.

In consequence of the extension of the work following the grant from the Imperial Department of Agriculture for the West Indies, it was found necessary to transfer the cultivation to a field of the Botanical Department and an area of about fourteen acres of land has been cleared and drained and put in cultivable order.

OLD VARIETIES OF CANES.

The results obtained with 20 of the older varieties of sugar-cane are here given and cover the series of experiments with these canes carried on continuously from 1886 to 1901. The author states that they show conclusively 'that prior to the commencement of the work with varieties raised from seed, no varieties were obtained which under the test of a long series of successive crops have given more favourable results than the standard West Indian varieties—the Bourbon and the White Transparent.'

CANES RAISED FROM SEED.

19,118 seedlings were planted out during the period of six years (1896-1901) and tables are given showing the results obtained with the seedlings of different years. The most interesting and immediately important results, however, are those obtained from seedlings raised prior to 1896 and which therefore have been subjected to a test of some considerable time.

We are told that of the earliest raised Demerara seedlings only Nos. 74, 78, 95 and 102 are retained in cultivation at the Gardens while practically only the first three are in cultivation on the sugar estates of the colony. Nine seedling varieties raised in 1890 are still in cultivation at the Gardens, six of which are being cultivated on the estates, the areas devoted to them varying from 1727 acres of D. 109 to 8 acres of D. 130; 442 acres of D. 145 are in cultivation.

Several of the seedlings raised in 1892 are stated to be of high promise, but only D. 625 has been grown on any scale on the sugar estates, 79 acres being now occupied by it.

The average results obtained during five crops from the varieties which were retained in cultivation until 1901, as indicated by the tons of saccharose per acre yielded in the expressed juice compared with that yielded by the White Transparent under the same conditions taken as 100, shows that seventeen seedling varieties have surpassed the White Transparent, D. 145 giving 153·6 and D. 109, 137·1 per cent. of the White Transparent yield. These results are chiefly due to an increased yield of cane: and there is much difference in richness and purity of juice in the different varieties. D. 109 and D. 145 have maintained in 1897 to 1901 the estimate formed of their relative value during the period 1892-95, but D. 135 which during the earlier period gave results slightly below those obtained with White Transparent during this later period comes to the front with a yield of 169 per cent. of the White Transparent variety with relatively rich and pure juice.

In 1896 relatively large plots of certain of the more favourable varieties were established and the results of 1897 to 1901 indicated that Demerara seedlings Nos. 625, 78, 145, 109 and 115 have given larger comparative yields than D. 74, that variety being selected as the standard for comparison, 'previous experiments having shown that the sugar yield of No. 74 in the Botanic garden fields is practically the same as those of the Bourbon or the White Transparent.' 'The two varieties which on the larger plot experiments have given the most favourable return, Nos. 625 and 78 owe their position to the heavy crops of canes yielded by them . . . . the saccharose contents of their juices have been low. . . . . Neither of these varieties appear to mature under the conditions prevalent in British Guiana.' D. 109 grown at the Gardens does not appear to have produced the enormous yields of canes per acre which it has produced on the estates.

The large plot results of seedling canes in Brick Dam field, plants 1900 and ratoons 1901, show that the yield of D. 74 was excelled by D. 625, B. 147, D. 145, D. 109 and D. 1087 in the order given.

Professor Harrison concludes this section of his report with the following: 'From the results of all our experiments it is clear that several new varieties of canes give yields far in excess of those of the Bourbon on soils on which the Bourbon has ceased or is ceasing to return profitable yields; this result has been very fully corroborated by the experiments conducted on many of the sugar estates of the colony. It marks an advance of high importance, but the still more important, the crucial question:—Will any of the new varieties give yields in excess of those of the Bourbon on soils where that cane flourishes, and if excess yields are obtained will they be profitable from the manufacturing point of view,—still remains unanswered.'

Details are given of the early results with newer seedlings and a number of general deductions of scientific interest are formulated in regard to the relation of seedlings to parent varieties and some other points. Chapter III concludes with a list of canes recommended as 'worthy of the attention of the planters of the colony for careful Experimental Cultivation' which includes Demerara seedlings 74, 109, 135, 145, 625 and also Barbados seedling 147; and a table is given showing the area of the different seedling varieties under estate cultivation to amount to something like 4,000 acres.

(To be continued.)

Seedling Cane D. 74 in Louisiana.

The following extract is taken from the *Sugar Planters' Journal*, December 6, 1902. The comparison between D. 74 and the Louisiana Purple and Striped cane has awakened considerable interest among planters. The experiments were conducted under the supervision of Professor Stubbs of the Louisiana Experiment Station:—

Run 6. Plant Cane, Louisiana Purple and Striped.—Pounds of cane ground, 23,361; extraction, 75·82 per cent.; pounds of juice extracted, 17,662; analysis of juice, brix 14·39, sucrose 10·69, glucose 1·70; maximum sucrose 11·00, minimum sucrose 9·60; pounds of first sugar obtained, 1,348; pounds of first sugars, per ton of cane, 111·2; analysis of first sugars, sucrose 96·05; analysis of first molasses, total solids 63·06, sucrose 36·10, glucose 16·60; maximum tonnage 35·03, minimum tonnage 28·28.

Run 7. Plant Cane, D. No. 74—Pounds of cane ground, 24,942; extraction, 76·87 per cent.; pounds of juice extracted, 17,662; analysis of juice, brix 15·56, sucrose 12·14, glucose, 1·13; maximum sucrose 12·90, minimum sucrose 10·70; pounds of first sugar obtained, 1,800; pounds of first sugar, per ton of cane, 144; analysis of first sugar, sucrose, 94·05; analysis of first molasses, sucrose, 35·39, glucose 9·50; maximum tonnage 38·51, minimum tonnage 29·40.

By tonnage is meant that three rows of cane were used in each experiment, and these three rows of cane were weighed separately, and the maximum and minimum given of each of these three rows. The stand of the purple and striped cane was excellent, while that of the seedling No. 74 was defective, yet the results showed that the seedlings yielded 144 ℔. of first sugar per ton of cane, while the purple and striped yielded only 111·2 per ton. What is known as seedlings No. 74 are such as have been distributed throughout the State to the sugar planters. They were devoloped from seed brought here from Demerara some years ago and planted by Professor Stubbs. He has already sent about 60 tons of cane to the planters in this State for planting purposes, and the results attained were eminently satisfactory

Mechanical Cultivation of Soils.

Mr. F. I. Scard, in his presidential address to the members of the Royal Agricultural and Commercial Society, expressed the conviction that we were within measurable distance of the introduction and general use of mechanical ploughs. Such an end has been the dream of planters for generations, and in 1875 the Combined Court offered premiums 'not exceeding $100,000 to any person or persons who shall introduce into the colony machinery capable of tilling the soil, and performing other work connected with the manufacture of sugar at moderate expense.' Many attempts were made with steam ploughs, the most recent being at Vryheid's Lust, and Vergenoegen, but without success. With the advent of oil motors, what has hitherto been a failure may prove quite practicable, and everyone will look forward with interest to any experiments which may be made in this connexion. (Demerara *Argosy*, Jan. 21.)

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following notes have been contributed by Mr. John R. Jackson, A.L.S., formerly Keeper of the Museums at the Royal Botanic Gardens, Kew, in continuation of his articles in this volume of the *Agricultural News*, pp. 21 and 25:—

After the spirit of business in certain directions immediately connected with the Christmas season and the disorganization of trade generally by the holidays as well as by the subsequent operations of stock taking and clearing up of the year, things take some time to settle down again. Consequently at the time of writing, namely, the first week in the New Year, business in city centres has been confined within very narrow limits. A general feeling of a brighter and more prosperous year is, however, said to prevail, and the prospect of the first drug sale of the year, which will take place a week hence from this date, is decidedly good. As however we have to record facts rather than indulge in prophecies, we proceed to review the markets from the date of our last communication. This will be found to be uneventful, which is the usual state of things when nearing the year's end.

GUM ARABIC.

The unsettled condition of several parts of the world, notably Somaliland and Morocco, has influenced the position of some well known products, one of which we may instance, namely, gum arabic, a fact which shows the necessity, either of secondary sources for any indispensable product, or of some available substitute. Opposed as we are to substitutes generally, it would seem that out of the numerous species of *Acacia* known, a picked or sorted gum might yet be found to tide over a time of scarcity, which might perhaps end in establishing for itself a reputation of a lasting character, if not for use in food or medicine, at least for manufacturing purposes,—a remark that applies to products other than gums.

GINGER.

During the month of December spices generally fluctuated but little. Jamaica ginger began in the early part of the month at 36*s.* 6*d.* to 38*s.* per cwt. for ordinary dull, while a small lot, at a later sale, was bought in at 44*s.* for middling dull, declining again just before Christmas to 37*s.* 6*d.* to 41*s.* 6*d.*

NUTMEGS AND MACE.

Nutmegs and mace sold generally at steady prices. At the same sale West Indian mace of fair pale quality was disposed of at 1*s.* 7*d.* to 1*s.* 8*d.* per ℔. Pale and reddish at 1*s.* 6*d.* to 1*s.* 7*d.*, and broken at 1*s.* 5*d.* At the same sale some fair pale to reddish Bombay was sold at 4¼*d.* It may be as well to state, however, that a short time prior to this sale some mace from Bombay was shown at Liverpool and was proved to be the produce of *Myristica malabarica* which is sometimes used for adulterating true mace, especially when the natural dull colour is heightened by an aniline dye. The adulterant has neither taste nor smell. It is not improbable that the low price realized for the Bombay mace was due to its mixture with this fictitious mace.

PIMENTO.

Pimento maintained a fair equality throughout the month and at the closing sale of the year it was reported in fair demand, 509 bags being offered and 389 bags sold at 2*d.* to 2⅛*d.* per ℔. for ordinary mixed black.

SARSAPARILLA AND BAY OIL.

Sarsaparilla at the mid-monthly sale was represented by 36 bales of grey Jamaica; the bulk being country damaged, sold at 1*s.* 1*d.* to 1*s.* 2*d.* per ℔., while the sound was disposed of at 1*s.* 3*d.*, and four bales of fair red native Jamaica realized 9*d.* At the same sale four bales of chumpy Mexican sold at 5*d.* At the sale in the early part of the month, West Indian distilled Oil of Bay was reported as limited at 5*s.* 9*d.* per ℔., a bid of 5*s.* 8*d.* being refused.

ARROWROOT.

Now that special interest has been drawn to the subject of the cultivation and preparation of arrowroot at Barbados, (*Agricultural News*, Vol. I, p. 227,) it may be interesting to know that at the first sale in December, a parcel of fine St. Vincent arrowroot was bought in at 5½*d.* per ℔. A week later good St. Vincent sold at 3¼*d.* and a few barrels of common at 2½*d.*, while several hundred barrels good manufacturing St. Vincent was privately disposed of at 3¼*d.* per ℔. This price was maintained at the close of the month, 200 barrels being thus disposed of out of 1,318 packages offered. In connexion with the production of arrowroot generally,—and it must be borne in mind that this product is furnished by other species of plants besides *Maranta arundinacea* which yields West Indian arrowroot,—it seems that in Queensland the year's produce in 1901 showed a considerable falling off from that of the previous year, the figures standing as follows:—1900, 772,280 ℔.; 1901, 704,480 ℔.

VANILLA.

An item that will have some interest to vanilla growers is the following:—A consignment of about 300 kilos of vanilla cultivated in German East Africa arrived in Hamburg a short time ago. The beans are said to be of fine dark chocolate colour and are commencing to crystallize. They are of various lengths, and are reported to compare favourably with the best Bourbon quality.

LIQUORICE.

Though liquorice is not a West Indian product some notes on this particular article contained in a Consular Report on the Agriculture of the Trans-Caucasus will no doubt be of some interest to all those engaged in the produce of the soil. It is stated that the quantity of liquorice root collected in the spring of the past year amounted to about 20,000 tons, half of which quantity would in all probability have been exported to America before the close of the past year, and the other half, which under ordinary circumstances would be sent forward in the coming spring is likely to remain in the Caucasus until the end of the present year, in consequence of over production and the large stocks of root now held in the United States. It is said that practically two years' crops have been sold and handed over to the New Combine, and one year's crop is still lying in the Caucasus. Commenting on these facts the Consul expresses an opinion that the men who have recently amalgamated in America and are composed of dealers in tobacco and liquorice root, will be compelled to hold back the sales of the root so as to regulate to a certain extent the prices, and thus prevent heavy losses.

CAPSICUM.

It may be worth noting that at a recent meeting of the Liverpool Chemists' Association, some capsicum fruits were shown that were grown in Jamaica from seeds brought from Nyassaland, and they differ from the original type, being smaller and of a somewhat duller red. Their market value has not transpired.

JAMAICA.

Exports for 1902.

The following particulars of the exports of Jamaica for the year ended March 31, 1902, have lately been published in the Supplement to the Gazette:—Annatto, £1,643; Beeswax, £6,020; Honey, £9,241; Divi-divi, £985; Cacao, £83,923; Cocoa-nuts, £61,817; Coffee, £152,091; Bananas, £825,288; Grapes, £7,671; Limes, £440; Mangos, £725; Oranges, £102,780; Pine-Apples, £2,361; Ginger, £37,358; Kola Nuts, £238; Lime Juice, £7,872; Pimento, £79,288; Rum, £124,425; Sugar, £136,704; Tobacco leaf, £2,394; Cigarettes, £1,547; Cigars, £11,904; Fustic £17,084; Logwood, £103,795; Logwood Extract, £26,144, Yams, £152.

The following notes on agricultural subjects are recorded by the Collectors for their respective parishes:—

ST. ANDREW: The Elder Dempster Company has started a new industry—the cultivation of cassava. Generally speaking all the crops, except honey, have been sold at fair prices during the past year, with good demands prevailing, and the same prospect is apparent for the coming year.

ST. MARY: The banana industry which had been retarded by the storm of 1899 had last year fully recovered itself, and I am now able to state that the exports in this article during the year which closed on March 31 last, show a marked increase of nearly 700,000 stems. There has also been a very large increase in cocoa-nuts exported, amounting to over 1,800,000 nuts.

The supply of bananas appears to have been sufficient to support the demand on the growers by the several Companies seeking their patronage, yet there are signs in the near future that the supply will be insufficient to keep alive all engaged in this industry, as competition is very strong and capital and influence in the home market will, I am afraid, drive the weaker competitors out of the market. The possibilities, however, of the industry are enormous, and the producers have a bright future before them.

ST. ANN: The manufactory at Retreat turned out 70 casks, 7,650 gallons of raw lime juice and 20 gallons of essential oil, employing 10 women; Orange Valley employed 150 persons and turned out 500 casks containing 55,000 gallons, raw lime juice, 50 cases, 242 gallons oil of limes and 2 cases containing 9 gallons oil of Seville oranges.

TRELAWNY: The cultivation of the banana is increasing; the pimento crop gives an unusually fair promise, and the sugar and rum crops are heavier than usual.

WESTMORELAND: The bee-keeping industry is still being kept up and is in some instances a source of subsistence to the peasantry. The cultivation of bananas, I regret to say, is not carried on to such an appreciable extent as it should be, seeing there are lands quite adapted for planting this fruit, and moreover there is a growing demand for it in this parish, as it has been discovered that it possesses very nutritious qualities and is so easy of digestion. The people are now using it as a diet and the demand for home consumption is greater than that produced.

MANCHESTER: The year just passed was no improvement on its predecessor; except for a very fitful and short lived rise in coffee, the price of produce generally throughout and trade were dull. The orange crop found no market, and ginger suffered severely from heavy rains at curing time.

Neither orange nor coffee is expected to yield more than ordinary crops. Pimento promises plenty in some districts and the reverse in others. The coming year is not viewed very hopefully by those who are qualified to judge, but it seems too early to prophecy.

ST. CATHERINE: The cultivation of bananas is being rapidly increased and St. Catherine has already become famed for its high class of fruit, indeed it far surpasses any of the other fruit-growing parishes, and on some properties as much as 95 per cent. of straight bunches (9 hands and upwards) is produced. In the St. Thomas-ye-Vale district until very recently not much was done in the cultivation of bananas; within the last year or two however, it has been considerably extended and places which were not considered adapted to the cultivation have proved to the contrary, and it is estimated that the out-put in 1902-03 will exceed last year by over 50 per cent.

Cacao Planting in British Guiana.

The year's production of cacao is above that of 1901. More land is under cultivation and more of the home-made product is being consumed locally. Our planters are fortunately free from the loss and irritation arising from the witchbroom disease so prevalent in Surinam; and there is no trouble from high winds. Whatever may be said of shade trees in other countries, cacao trees grow and thrive here without them. We are informed that the local production fetches 61*s.* to 63*s.* in the London market, a remunerative figure. Among the cacao plantations are: Coverden, Dunoon, Endeavour, Uitkomst, Land of Canaan, Soesdyke, Noitgedacht, Le Desir, Look Out, and Belfield in Essequebo. There are some 1,400 acres under cacao cultivation in the colony, 1,200 of which are in the Demerara county. (Demerara *Argosy*, January 3, 1903).

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 31 of the issue for January 17.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

VOL. II. SATURDAY, FEBRUARY 14, 1903. No. 22.

NOTES AND COMMENTS.

The Development of the West Indies.

The *Louisiana Planter* of November 22 last, discussing recent reports of the West Indian Botanic Stations, thus refers to the development of minor industries in the West Indian colonies:—

'The wonderful development of the banana industry around the rim of the Carribbean Sea and the Gulf of Mexico suggests that there are other things besides sugar in which the people of the tropics can trade with the United States. The cacao, or chocolate bean, industry is one that is commanding considerable attention. Coffee can be produced in the mountains and many valuable plants and vegetables on the plains. So, altogether, the cry of distress and call for relief coming from the British West Indies seem nearly as strange as when such calls came from the hill district of North Louisiana some seven years ago, the result of the great drought of that year, when short crops and no accumulated reserves found our somewhat over confident and sometimes careless people unprovided with the actual necessities of life.'

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Fuel at Barbados.

One rather serious effect of the prolonged quarantine against Barbados is the scarcity of fuel. Barbados has no forests of its own. They have long since disappeared. The island is now dependent for its fuel—cord wood and charcoal—on the neighbouring islands. There are no restrictions against the entry of these articles on arrival at Barbados, but the small craft engaged in the trade are said to be subjected to quarantine on their return and so lose time Owing to the scarcity of fuel it is noticed that many of the few remaining trees in Barbados, are being cut down and converted into fire-wood. This is an unfortunate circumstance, as if such a practice is continued it must tend to render the atmosphere less humid and, therefore, not so favourable for the production of crops. It is suggested that the native petroleum (already used in boiler furnaces) might be utilized in the form of 'brickets' for domestic purposes. Failing this, Barbados should grow its own fuel on the waste lands round the coast. The *Casuarina* tree is planted for this purpose in India. The city of Madras is said to be entirely supplied with fuel from this source.

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Cotton and Onions.

A large and important meeting of the Barbados Agricultural Society was held on Friday the 6th. instant, when an address was delivered by Dr. Morris, C.M.G., the Commissioner of Agriculture for the West Indies, embodying some of the results of his recent visit to the United States, Canada and Bermuda and discussing the conditions necessary to establish the cultivation of cotton and onions.

Considerable interest was aroused at the meeting by the specimens of cotton plants, flowers, pods and lint exhibited from Kent Plantation. Cotton is now being grown experimentally at St. Kitt's, Antigua, Montserrat and St. Lucia. About 600 acres were under cultivation up to the end of 1902. At Barbados experiments were started only a few months ago. There are at present 24 estates, with trial plots in cotton covering about 16 acres.

The onion industry is fairly well established in the northern islands. About 100 acres are probably under cultivation in Antigua and Montserrat. At Barbados, at present, onions are being tried on 14 estates, covering about 10 acres. The prospects of both the cotton and onion industries are promising.

The substance of the address above referred to is published to-day in No. 21 of the Pamphlet Series. It is obtainable from all Agents of the Department, price two-pence.

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Birds of Barbados.

A short note on the resident and migratory birds of Barbados appears elsewhere in these pages. In order to encourage a more detailed study of the birds of the West Indies it is proposed to re-publish in the *West Indian Bulletin* an important paper on the birds of Barbados contributed to *The Ibis* in 1889 by Colonel H. W. Feilden. The birds of other parts of the West Indies will be dealt with later. In the meantime we should be glad of notes respecting West Indian birds for the *Agricultural News.*

Improved Breed of Goats.

'Black Rock' the Anglo-Nubian goat, lately imported by the Imperial Department of Agriculture for improving the breed of milking goats in the West Indies, has been placed under the care of Mr. Drayton Field, the proprietor of the well-known dairy establishment at Kennington, Belleville, Barbados. All applications in respect of the service of this animal at Barbados should be addressed to Mr. Drayton Field as above.

Introduction of Undesirable Animals.

The Voice of St. Lucia mentions the fact that the Manicou *(Didelphis)*, a destroyer of poultry, not hitherto existing there has appeared in the Colony. This instances the necessity of regulating the importation of noxious animals into these islands. They are undoubtedly many creatures whose introduction would be unwise, not to say positively disastrous, and the history of such introductions abounds with instances of enormous harm wrought by chance or direct introductions. It is unnecessary to quote the case of the mungoose or to remind our readers of the Ordinances in force at Montserrat and Dominica which impose a large penalty on the importation of so undesirable an animal. We believe its introduction is also interdicted under a penalty in the case of Carriacou. This question deserves to be generally taken up in the West Indies. Other colonies may well follow in the steps of Montserrat and Dominica, and place on record that they distinctly prohibit the introduction of any aminals whatsoever of a predatory habit except under such conditions as will prevent them becoming afterwards a pest to the community.

The English Sparrow in the West Indies.

A not unlikely introduction into the West Indies would be the English Sparrow possibly by way of Bermuda.

The following information in respect of the distribution of this bird in Bermuda, Bahamas and Cuba may be of interest in this connexion, taken from the *Year-Book* of the United States Department of Agriculture 1898, pp. 100-101:—

'It was sent to Bermuda from New York about 1874, and two years later was given the same protection accorded to other birds, its destruction being punished by a fine of 5 to 20 shillings. Ten years after its introduction it had increased so enormously that a bounty was offered for its destruction, and between 1884 and 1886 about £530 ($2,544) were expended, without causing any appreciable decrease in its numbers, notwithstanding the short time the bird had been present and the fact that the islands have an area of less than 20 square miles. It is said to have been imported into Cuba, and in 1877 was reported to have been introduced on New Providence, Bahamas, "within the last few years." It has not, however, increased rapidly on either island, for in 1891 it was reported as still not abundant and apparently had not extended its range to any of the neighbouring islands.'

Sugar-cane Experiments at British Guiana.

The following report prepared by the Sugar-cane Experiments Committee on the sugar-cane experiments carried out on estates in British Guiana has been published by the Board of Agriculture of that colony:—

The tables have been prepared from the data submitted by plantations in British Guiana which are taking part in co-operative experiments with varieties of sugar-cane.

They give, in the case of each variety reported upon, the means of the data supplied in cases where the area reaped of a variety was not less than one acre, the figures given in the record of the experiment showing the highest return of commercial sugar, and those given in the record of the lowest return. Where canes of a variety have been reaped during the crop-year, 1901-02, at the Board's Experiment Fields, at the Botanic Gardens, their average records are given for comparison with the results recorded by the estates as obtained on the manufacturing scale.

It is much to be regretted that the plantations belonging to one firm on whose estates experiments with varieties of sugar-cane have been carried on perhaps on more extensive scale than elsewhere in the colony, have not seen their way to furnish the Sugar-cane Experiments Committee with their results.

The Sugar-cane Experiments Committee being impressed with the danger which underlies hasty deductions from agricultural experiments conducted over the crops of only one year even when carried out on the relatively large scale these have been, refrain from making any observations on the results, and from drawing any deductions therefrom. The data are placed on record for comparison with those which may be obtained in later series of experiments.

The value of the data vary greatly, the results recorded where the experiments have extended over large areas and on several plantations being generally more reliable than where, as in the cases of Nos. 625 and the Sealy variety, the areas were small and the number of experiments reported were few.

The mean yields in tons of commercial sugar per acre reported, are as follows:—

		Tons per acre.
1.	No. 625	2·95
2.	Sealy	2·49
3.	No. 95	2·24
4.	Bourbon	2·18
5.	No. 145	2·17
6.	White Transparent ...	2·03
7.	No. 74	2·03
8.	No. 147	1·99
9.	No. 109	1·91
10.	No. 78	1·39

It must be borne in mind that in the cases of the majority of the results recorded the varieties other than the Bourbon have been grown on land on which the latter cane does not flourish, while the Bourbon returns are as a rule, from land of fair average quality.

The Sugar-cane Experiments Committee desires to express its thanks to those proprietors, attorneys and managers, who have been good enough to place their experimental results at the disposal of the Committee for what it is hoped may prove ultimately for the benefit of the sugar-industry of this colony.

PARASITIC AND SAPROPHYTIC FUNGI.

Fungi are distinguished from nearly all other classes of plants by not possessing green colouring matter or chlorophyll. In consequence of this they are unable to build up for themselves organic bodies such as starch and sugar from simple inorganic substances contained in the air and soil.

Fungi are divided into two groups according to the way in which they obtain their food; these groups being the 'Saprophytic' and the 'Parasitic' fungi.

A true saprophytic fungus is one that makes no attempt to enter the tissues of living animals or plants, but derives its nutriment solely from *dead* organic matter. The common moulds are good examples of the saprophytes: they are to be found on dead organic matter—bread, jam, leather, etc.,—which has been kept in a moist place for some days. Other saprophytes live on rotting organic matter—dead leaves, animals, etc.,—in the soil.

A true parasite, on the other hand, passes the whole of its existence on, and derives all its nutriment from, *living* animals or plants, and is unable to live on dead organic matter. These fungi are not common. The fungi which cause the rust of wheat, maize, sorghum, etc., are true parasites.

Besides these fungi there are others able to live and reproduce on dead organic matter, but also are capable, under certain conditions, of entering the tissues and living on the juice of living animals and plants. The majority of plant diseases are caused by fungi of this group. The fungi grow and produce their reproductive bodies on dead organic matter, which may be in the soil or lying about anywhere. They thus lie in wait, as it were, and are ready to seize the first favourable opportunity for attacking the host, when this plant is slightly weakened by drought, too much moisture, high winds, or rough handling causing wounds, etc. To combat these diseases it is thus necessary to remove as far as possible heaps of rotting vegetable remains, etc., from the fields, as these serve as regular nurseries for these pests. It is also necessary, of course, to destroy at once all parts of a plant which is known to be attacked by a fungus and not, as is too frequently done, to leave these lying about on the field, or to put them on a compost heap, ready to serve as sources of infection at the first favourable opportunity.

Nitric Fermentation of Molasses. In the fermentation of molasses made from beet-sugar it sometimes happens that a gas is given off which hangs as a dense, dark brown vapour over the surface of the liquid. The sugar-maker then says his molasses is in a state of nitric fermentation. This fermentation is due to the action of a denitrifying bacterium which acts on the nitre (potassium nitrate) present in the juice of the beet and decomposes it, giving off an oxide of nitrogen which on coming in contact with air unites with more oxygen forming the dark red gas. The same or similar bacteria are often present in soil and manure and bring about a loss of nitrogen.

BIRDS OF BARBADOS.

Probably the most recent account of the birds of Barbados is that given in *The Ibis* for October, 1889, by Colonel Henry W. Feilden, C.M.Z.S., F.G.S. After careful investigations the number of resident birds recorded by Colonel Feilden does not exceed fifteen. The local names of these are Yellow bird, Sugar bird, Sparrow, Cane Sparrow, Blackbird, Peewhittler, Rainbird, the two Humming birds (called Doctor birds), the Wood Dove, Ground Dove, Gaulding, Red-seal Coot, White-seal Coot and Puffin. The latter is said to breed regularly on Bird-Rock off the parish of St. Lucy.

It is interesting to note that the number of migratory birds, or birds of passage visiting the island in their annual flight, is stated to be fifty-five. Amongst these are the Golden Plover, Ring-neck, Sandy Plover, Cotton-tree Plover, Screaming Plover, Stilt Plover, Rock Plover, Snipe, Nits, Pika, Longlegs or Yellowshanks, Ducklegs, Cue, Chirp, Blackbacks, Wag and several Curlews. A few accidental visitors are the Cobbler or Frigate bird, Pelican, Booby, Tern and very rarely the English Lapwing and the Ruff Sand Piper. The total number of all birds recorded by Colonel Feilden at Barbados is eighty-two.

During the last few years a small bird, marked black and yellow, has appeared in the parish of St. Philip where it is known as the 'Grass Canary.' This is believed to have come from one of the neighbouring islands, probably brought over in a heavy gale. Another bird, the *Pied carreau*, or Mocking Bird of Grenada was introduced in 1901 by Dr. Morris. This is an insectivorous bird and likely to prove an acquisition to the island. A pair of these birds was recently nesting on a tree near the Garrison, and another pair at Chelston.

Dr. Morris' visit to Grenada.

A meeting of the Managing Committee of the Agricultural Society was held on December 20, at the Council Chamber for the purpose of meeting Dr. Morris, the Imperial Commissioner of Agriculture. Dr. Morris, as the people of the West Indies have fully learnt, has their interest at heart, and the Department over which he presides is doing much to improve the economic condition of these islands. It is manned by a number of devoted men, whose zeal for the economic regeneration of the British West Indies—zeal backed by patient scientific inquiry and study and personal sympathy with the people—is appreciated not only in the British West Indies but has attracted the sympathetic notice of agriculturists in the United States and in foreign countries.

Several papers of importance were laid before the meeting, upon which the advice and opinion of Dr. Morris were eagerly sought. The discussion of, what we must term, the epidemic of thrips and the black blight, upon both of which diseases of the vegetable kingdom reports had been received, was very interesting, Mr. Broadway, the Curator, and Mr. McNeil, the Agricultural Instructor, had reported upon the first-named pest. Mr. McNeil's report upon the 'black blight' was also an interesting and instructive paper. This last-named gentleman is doing good and valuable work in a quiet and unobstructive manner; so also is Mr. Broadway. (Grenada *Federalist*).

WILD PINES.

The Wild Pines belong to a curious order of flowering plants, the Pine-apple order *(Bromeliaceae).* Most of the plants of this order are natives of South America and the West Indies. Many are good examples of plants which, instead of rooting in the soil in the ordinary way, grow high up on trunks of trees, etc. They are not however parasites, as they do not absorb any food material from their 'host' but simply use this as a support.

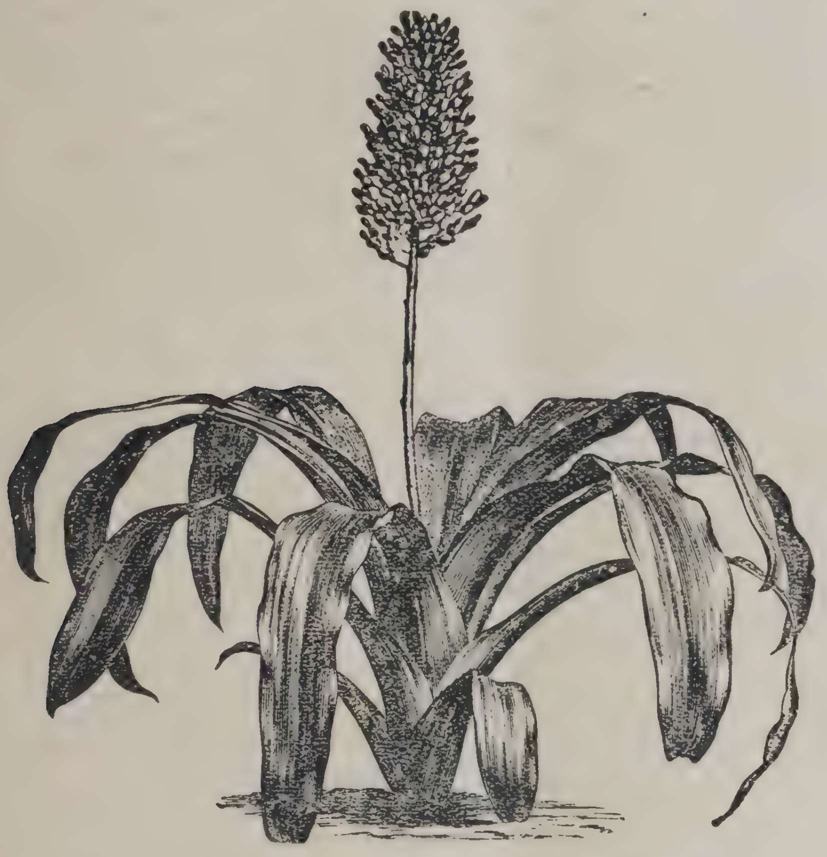

Fig. 7. A Wild Pine. (Aechmea fulgens). Showing general habit of the plant.

They have a very reduced stem, which bears a rosette of fleshy leaves, channelled on the upper side and fitting very closely together at their bases, so that the whole plant forms a kind of funnel, which is usually filled with water. In this the forest birds often find their only supply of water and later the decaying remains of animals, leaves and other débris, are to be found. The bases of the leaves possess numerous peculiar scaly hairs by which water and other substances collected are taken up. There are a number of roots which fasten the plant to its support, but the plant is not so dependent on these for its supplies of food materials as is the case of plants growing in the ground.

The leaves being thick and fleshy act as store-houses of water, and their thick skin prevents it evaporating too rapidly. The group of flowers (inflorescence) arises from the centre of the funnel of leaves.

Various species of *Aechmea* or 'Wild pines' are common on trees in the moist forests of this part of the world, and are to be seen to perfection in Dominica, Trinidad, etc. In islands such as Barbados, where true tropical wet forests do not exist, they are correspondingly scarce, but a few good clumps can yet be seen in Turners Hall Wood.

STOCK SALE AT GRENADA.

The following results of a sale of stock held at Woodland Stock Farm, Grenada, on January 23 and 24 last, have been contributed by Mr. M. McNeill, Agricultural Instructor :—

The first annual sale of stock at the Woodland Stock Farm, Grenada, took place on Friday and Saturday, January 23 and 24 last. The weather, which was showery on Friday morning turned out fine by noon, the hour at which the sale was advertised to commence, and remained favourable for the rest of the time. A few stock breeders from Demerara, Trinidad and Tobago were present and about 200 local people, principally planters.

Competition among buyers was keen throughout, and particularly so when the Angora goats and Hereford cattle were offered. Prices ruled high in consequence. The sale realized a total of £1,800.

Small stock were offered first and eighty pure-bred Plymouth Rocks were sold at an average of $4.00 each. These were in excellent condition ; the best of them were imported from Messrs. Thomson and Hawkins, United States of America. Eight of the Angora goats were sold at $25.00 each. These were bred from a pair which were imported from J. Murray Hoag, South Africa, some time ago at a cost of $200.00. A number of these interesting and beautiful animals have been retained for breeding purposes. They cost practically nothing to keep, when they can have access to the bush peculiar to the hillsides of these islands. These animals are rarely seen on the lowland pastures, and are useful for clearing away the undergrowth from the uncultivated land. Their wool is of some value, worth 2*s.* per lb. The average clip per goat weighs 4 lb., and they are clipped twice in a year. It may be worth mentioning that Mr. Hoag, the breeder from whom these animals were originally obtained, has recently sold a buck for $1,400. All the Southdown sheep were bought locally.

The horses, all from Mr. De Freitas' English thoroughbred Ager, sire Ayshire, bred by the Duke of Portland, realized an average of $40 each. Some were bought by local buyers and others went to Trinidad and Demerara.

The Hereford cattle were bought by local purchasers at an average of $40.00 each. Owing to the keen local demand for this breed for the butcher, Mr. De Freitas has retained his pure-bred bull for future use. The Zebu cows and heifers were purchased by local, Trinidad and Tobago buyers. Some also went to Demerara. The pure-bred bull went to Jamaica and realized $200.

Berkshire pigs, native cattle, turkeys, Guinea birds, geese and ducks also went out at good prices.

The visitors who saw this estate for the first time were surprised and delighted with it. The extensive wooded pastures resemble a well-kept English Park. The cane cultivation is in very fine condition and the buildings and estate generally kept in an orderly manner not commonly met with in the smaller islands. It might not be out of place to mention that the seedling cane B. 147 has proved very satisfactory on this estate and is ratooning strongly the third and fourth years.

Carbon dioxide and Bacteria. The power of carbonic acid gas (carbon dioxide) to kill bacteria is, as a rule, over estimated. It has been shown that this gas has no power at all on certain bacteria, these latter thriving even in an atmosphere of the pure gas. This fact destroys the idea that aerated mineral waters are necessarily devoid of germs.

NUTMEGS AND CLOVES.

CROP PROSPECTS IN THE EAST INDIES.

Through the kindness of Dr. H. A. A. Nicholls, C.M.G., of Dominica, we are enabled to publish the following important communication received by him from his London agents Messrs. Boddington & Co.

'We have received through the London Correspondent of an Amsterdam house the following:—

"In our last Dutch auctions high prices were paid for all kinds of nutmegs and mace and everything was sold with a good demand. The advance has already partly discounted the bad outlook of nutmegs during the next few years but certainly to a small extent only. The low prices ruling during the last few years have been the cause of a decrease in the production which has fallen off more and more on Banda Island since 1901 and feel sure that the effect of it will be more acutely felt in 1903 and during the next few years as not only is a small and late crop expected on the Banda Island in 1903 (November instead of May to June) but it is anticipated that the crop will not yield more than one third of the average quantity on account of the drought from which the East Indies have suffered throughout this year. Besides this, the quality of nutmegs and mace will be poor. Considering that values ruling at present are only one third of what they were in 1872 in which year nutmeg prices in Holland reached 215c.[*] for 110's to 115's, and taking into account that the consumption is increasing steadily and will continue to do so independently of the price, it seems that present values are ripe for a further advance.'

"The Amboyna clove crop is also reported to be affected by drought and it is a total failure and will not yield this year more than 200 piculs[†] against 6,000 last year."'

TREATMENT FOR TICKS.

An interesting paper on 'Stock rearing in Jamaica' appeared in the *West Indian Bulletin*, Vol. III, pp. 203-06, from the pen of the Hon'ble P. C. Cork, formerly of Jamaica, now Colonial Secretary of British Honduras. His practical notes on ridding cattle of ticks are given below:—

There had been a plague of ticks and many cattle had died of tick fever, reducing the herd to 250. Only twenty-five calves had been reared the previous year. This 'Pen' came under my control, and I set about inquiring into the causes of the wastage of stock that had occurred, and found that in addition to the tick fever, the great mortality had been caused by screw worm, and by failure in milk production of a good many cows. I suffered under the great disadvantage of only being able to devote an occasional week end to personal supervision, but after long application to desk work for several days, it was a great relief to mount a horse and ride through the pastures, examine the statistics, and inspect the herds, analysing everything as best I could so as to trace back results to their true cause and devise a speedy and economical remedy for defects. Change of occupation is most restful and I experienced its benefits. For the tick fever I used kerosene oil emulsion (being the cheapest preparation I could discover), and the pen men added green tobacco leaves pounded so as to get out the juice, applied with whitewash brushes. This mixture, applied whenever an animal came into the pen with ticks soon gave the stock shining, clean coats.

MINING INDUSTRIES OF BARBADOS.

The following account of the manjak and petroleum industries of Barbados is taken from the recently published *Colonial Report on Barbados*, 1901-02.

ASPHALTUM OR MANJAK.

The only mines are those in connexion with the extraction of manjak, an industry which may be said to be still in its infancy. The first mine was opened on College estate in January 1896. In 1901 there were nine mines at work, and of these, three are in the hands of a company called the Barbados Manjak Mines, Limited, employing from seventy to one hundred labourers daily, who are paid for tunnelling and timbering work by the piece or task.

At one mine, where only eight persons are employed at 1*s.* a day each, the annual output is about 200 tons. Here there is but one shaft, and the manjak is brought to the surface by means of a winch worked by hand. The manjak from this mine realized an average price of £9 per ton, the refuse being disposed of at a much lower price.

There is no legislation requiring the owners of manjak mines to make returns to the Government, and they are not in any way under Government supervision. So far, no necessity has been shown for such supervision, excepting perhaps the extreme reticence on the part of most of the owners to afford information and statistics. The Customs returns show that during 1901 as many as 1,043 tons, 16 cwt. were exported from Barbados. This quantity taken at the value of £9 a ton, places the gross value of the industry at £9,394.

Manjak, or glance pitch, as it is sometimes called, is used for making the varnish known as brunswick black, for insulating electric cables, etc.

The export of manjak during the last five years is stated to have been as follows:—

Year.	*Tons.*
1897	1,880
1898	1,160
1899	1,026
1900	1,120
1901	1,043

PETROLEUM.

In the same district in which the asphaltum or manjak deposits are found, petroleum exists in small quantities. This industry is also in its infancy, and in the absence of legislation and Government supervision the yield and money value of it cannot be ascertained. There are some nineteen wells, and of these there are about twelve which vary in depth from 60 feet to 1,000 feet, and from 4 to 6 inches in diameter, yielding about 1,400 gallons of oil per week. About sixteen persons are employed in the actual collection of petroleum and they are paid by task work, about 10*d.* per 50 gallons.

The petroleum is disposed of locally at a price of 2*d.* to 6*d.* per gallon, and is used as fuel and for lubricating machinery on some of the sugar estates.

The annual output may be stated at 7,200 gallons—worth about £1,000.

Antiseptic Starch Paste. Starch paste made with an aqueous solution of borax in place of water will not, it is stated, be decomposed by bacteria or fungi. Paste made as above has been recommended, for instance, for affixing the labels on wine bottles kept in store; in this way the labels are not rendered illegible by the growth of moulds.

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[*] Presumably reference is made to the Dutch coinage. 100 Dutch cents = 1 guilder = 1*s.* 8*d.* [Ed. A. N.]

[†] 1 picul or pecul = 136 ℔. avoir., nearly. [Ed. A. N.]

DEPARTMENTAL REPORTS

ST. LUCIA: REPORT ON THE BOTANIC STATION; AGRICULTURAL SCHOOL; AND EXPERIMENT PLOTS, 1901-02. By Messrs. J. C. Moore and G. S. Hudson.

Botanic Station: Amongst the more important new works undertaken during the year were the erection of a shelter and a Foreman's cottage. The former meets a long felt want and adds greatly to the convenience of visitors during rainy weather. The routine work of the Station has been steadily carried on. Considerable improvements have also been effected in the ornamental features of the grounds. Easterly gales were experienced in July and August which caused considerable damage to trees at the Station. The nurseries were kept fully stocked with economic and ornamental plants. Of these over 15,000 plants were distributed during the year besides large quantities of seeds and cuttings.

The rainfall for the year totalled 99·71 inches.

Agricultural School: The report deals chiefly with the organization of the new Agricultural School founded in October 1901, and maintained entirely from Imperial Funds administered by the Imperial Department of Agriculture for the West Indies. The school is situated at Union estate about 4 miles from Castries. This property was acquired by the local Government early in 1901 and a portion of the land, including existing buildings was transferred to the Imperial Department of Agriculture, for the purpose of this Institution. Seventeen boys were in residence at the close of the year ended March 31, 1902. They received practical instruction in Agriculture and Horticulture every day, except Sundays, for three and a half hours. Four hours a day were also devoted to indoor work, the instruction comprising reading, writing, composition, geography, arithmetic, and the elements of Agricultural Science. Cricket and indoor games were also provided for the amusement of the boys. No difficulty was experienced in maintaining the discipline of the school, the only punishments necessary being the reduction of good conduct marks and the imposition of tasks during recreation hours.

A portion of the grounds of the School is devoted to boys' gardens. In the cultivation of these, during spare time, the pupils take great interest. One boy is stated to have sold upwards of 21*s.* in vegetables from his plot of 300 feet square during a period of five months. The cultivation of vegetables and ground provisions also occupied considerable attention. Since December 1901, the School was practically self-supporting in this respect. The receipts from the sale of surplus produce amounted to £7 3*s.* 6*d*,

The expenditure, including part cost of repairs to buildings, on the Institution from the Imperial Grant-in-Aid for five months ended March 31, 1902, was £1,790 2*s.* 11*d.*

Cacao and other Experiment Plots: Five experiment cacao plots were maintained by the Department in various districts of the island. In addition, experiments in the cultivation of limes, cotton, pine-apples and other products were carried on at the Riviere Doreé Experiment Station, situated in the southern district of the island. The results obtained from these plots are given, and are, on the whole, of a satisfactory character.

DEPARTMENT NEWS.

Mr. Harold Maxwell-Lefroy who as already announced has been appointed Entomologist to the Government of India, leaves by the mail steamer to-day. Mr. Maxwell-Lefroy carries with him the best wishes of his colleagues on the staff of the Imperial Department of Agriculture. Within the comparative short period that Mr. Maxwell-Lefroy has been in the West Indies he has made several valuable contributions to science as well as afforded practical advice in the treatment of insect pests of great service to the planting community. His future career will be followed with great interest by his colleagues and friends in the West Indies.

In order to render the publications of the Imperial Department of Agriculture easily accessible to all who are interested in the welfare of the West Indies, Agents have been appointed thoroughout these colonies, who, either keep a stock in hand or are able to obtain any publication, still available, at a short notice. We are glad to be in a position to announce that the offer of the West India Committee to assist the Department in distributing its publications in the City of London has been accepted and that copies of the current *West Indian Bulletin*, the *Agricultural News* and the Pamphlet series will be obtainable, at cost price, at the office of the West India Committee, Billiter Square Buildings, London, E.C., until further notice.

Lectures to Teachers at Barbados.

The third of the course of lectures at the St. Peter's centre on the manner and method of teaching the principles of agriculture in elementary schools by means of object lessons, was delivered in the parish room at Speightstown on Saturday, the 7th instant., by Dr. Longfield Smith. Nearly 30 teachers attended. The subject was 'The Soil.' Besides the teachers, several ladies and gentlemen of the parish were present.

The next lecture, on the same subject, will be delivered at St. Philip's, on Saturday the 21st. inst.

West Indian Nettle. A rather formidable nettle is met with in some of these islands, but wherever it is found it is carefully shunned by all classes of the community. It is a large, green, annual weed about 3 to 5 feet high. It is rather common in Nevis by the roadside beyond the Bath. It is also found in Grenada and according to Griesbach it occurs in dry Savannahs near Kingston in Jamaica. It may readily be recognized by its rather large rough green leaves somewhat resembling those of the castor-oil plant. The flowers are small, white or yellow, star-shaped and produced at the ends of the branches. Every part is covered with stinging hairs and if incautiously handled the plant may cause considerable pain and not infrequently fever. The botanical name is (*Mentzelia aspera.*)

GLEANINGS.

The British Cotton Growing Association has decided to make a grant of £100 to encourage the growing of cotton in Jamaica.

The Verley Fruit Co., of Providence, Rhode Island, is about to extend its fruit and passenger trade between the United States and Jamaica. Its chief energies will be directed to developing the banana plantations already owned by it in Jamaica. A weekly service with two new steamers, *Vera* and *Verona*, will commence in March next.

Man is born an agriculturist; and it is both bad morality and bad policy to invite him, by fortune or by honours, in other words, by avarice or by ambition, to leave the plough and the fields. It is a mistaken idea to give education to the children of peasants only to make them come out of their sphere. No one is too learned to be an agriculturist, hardly anyone is learned enough for it. (Alphonse Karr.)

The Demerara *Daily Chronicle* records this amusing story told by a Demerarian who recently visited one of the islands. On landing he proceeded to the Botanic Gardens, and, desirous of obtaining some favour, he addressed an inquiry to an old man who was pottering about the place. The old fellow, who possessed no authority on his own account but was anxious to oblige, went to the telephone, remarking: 'Alright, sir, I'll ring up the Creator.'

Amongst the food stuffs imported into Barbados for the use of Public Institutions are, arrowroot, biscuits, white beans and cornmeal, to the total annual value of over $3,500.

Sweet potatos are another important item, their estimated annual value being about $1,400. There would seem no reason why the articles at present imported should not also be grown in the colony.

His Honour the Commissioner of Montserrat entertained a number of small owners at the Grove Experiment Station, on Saturday, January 24. About thirty attended, representative of all parts of the island. The visitors were shown over the Station by the Agricultural Instructor. The plots of onions and papaws, and the experiments in budding proved of special interest. At the conclusion a vote of thanks was passed to the Imperial Department of Agriculture for its efforts to improve the island.

Mr. Watkins proposes to hold similar meetings at intervals, and also others for the older school children.

As indicating what can be done in the cultivation of vegetable crops on small areas with careful tillage and manuring, the following extract from a recent report of the Agricultural Instructor at Montserrat is of interest:—

Shallots—Size of plot, 58 ft. by 20 ft., or about $\frac{1}{40}$th part of an acre, yielded $145\frac{3}{4}$ lb. green Shallots, or at the rate of 5472 lb. to the acre.

His Honour H. Hesketh Bell, Administrator of Dominica, recently addressed a letter to *The Times* drawing attention to the advantages offered by Dominica to intending planters. He remarks that 'while it is exceedingly difficult to purchase a plantation already yielding crops of cacao or limes, there are over a hundred thousand acres of very fertile land in the possession of the Crown which can be purchased for 10*s*. an acre with facilities for payment. There is, at present, no tax on land, and other imposts are very light. There is a good supply of labour at rates varying from 8*d*. to 1*s*. 2*d*. a day, and the population is steadily increasing. The rainfall is abundant, and a great number of streams afford water power.' Mr. Bell suggests £1,500 as the *minimum* capital for an intending planter.

The cacao crop of Trinidad is expected to be very large this season. The *Port-of-Spain Gazette* estimates that during the month of December, close upon 20.000 bags (of 130 ℔ each) will have been brought down by the railway.

The proportion of dry to wet cacao is said in Grenada, on highland estates, to be about $37\frac{1}{2}$ per cent. A careful series of experiments conducted by a planter in the island show that 80 ℔. of wet cacao give, when dry, 30 ℔. of beans ready for shipment. It would be interesting to learn how these figures compare with the yields obtained by planters on low land estates in the same island where the proportion of dry cacao is often said to reach as much as 50 per cent. of the total weight.

The *Board of Trade Journal* states that in a report on St. Joseph (Missouri U.S.A.) as a distributing centre for imported goods, written by the British Vice-Consul at Chicago, and recently issued by the Foreign Office, it is pointed out that from 3 to 15 tons of cacao butter are used in a month for the manufacture of candies. This article is generally purchased in Belgium or Germany, but sometimes in the United Kingdom. Very few offers are received from British merchants, but any offer of first-class cacao butter made to the manager at St. Joseph of the National Biscuit Company, would receive consideration.

The Grenada *St. George's Chronicle* draws attention to the necessity of supplementing the cacao industry with others, in view of the rapid increase in cacao production in other parts of the world. The export of this crop from West Africa has risen from 166,054 bags in 1898 to 297,054 bags in 1902. From South America also increased production is recorded. Bahia for instance exported 192,000 bags in 1900, and 236,546 bags in 1902.

It has been estimated, taking 12,000 hogsheads of sugar as an average crop of Antigua, and 46 inches of rain as the average fall, that for each inch of rain beyond the average the island produces 261 hogsheads of sugar.

EDUCATIONAL.

Object Lessons.

The following hints on the giving of object lessons in elementary schools are taken from a pamphlet published by the English Board of Education and reprinted in the *West Indian Bulletin*, Vol. III, pp. 212 etc :—

Object lessons, however, although not continuous in the sense of forming a systematic study of a particular science, should be classified into convenient groups. The selection of objects for study should be made with a purpose. A miscellaneous list of lessons which is not carefully thought out and designed to produce some definite result is as undesirable as a course in a specific science.

In a good object lesson the object is approached from many points of view, and all knowledge that bears on the object has its place. The same object when dealt with as part of a science course is only or mainly considered in its connexion with that particular science, and, in consequence, becomes much less rich in general significance. The mental development of children in primary schools has not reached the stage when specific study of a particular science is profitable.

Nature studies should direct the children's attention to natural objects which are to be met with in their own neighbourhood, and they should be varied and not confined to one class. For example, it is not desirable that the children should only learn about flowers and insects and learn nothing about the common phenomena of nature; nor again, that the object lessons should deal with the elements of chemistry or physics or mechanics to the exclusion of the study of living nature such as plants, insects, and birds.

OBJECT TEACHING AND PRACTICAL INSTRUCTION.

By Object Teaching the hand and eye ought to be trained to assist the development of a child's thinking powers. A child who has seen with his eyes and illustrated by use of his hand, partly by preserving in a collection, partly by modelling in clay, and partly by drawing, some of the objects which are described in the numerous books on Nature Study will possess the power of observing and comparing and distinguishing and classifying and adapting the results of all these processes to some practical purpose. Such results are of use in all walks of life. They are essential to the enjoyment of country life.

All good Object Teaching should give the scholars something to do with their hands. The oral lesson by itself is very inadequate. The oral lesson which is accompanied by demonstration is an improvement upon one which is without this illustration, but to make the instruction really complete, the scholar must make and record observations, collect specimens, make rough drawings and plans, and perform experiments for himself, and thus take an active share in his own instruction and learn to teach himself under guidance. School expeditions are a useful part of this kind of teaching.

In every country school it is quite possible that a rough map may be constructed and hung up, showing, with the school as a centre, the places within easy distance where various natural objects may be seen and studied.

BRIEF NOTES ON FUNGI.

WHAT THEY ARE AND HOW THEY GROW.

The following paper was read by the Hon'ble Francis Watts to the Antigua Agricultural and Commercial Society on Dec. 5 :—

Every agriculturist, in every part of the world, is sure to have fungi or their effects thrust upon his notice, and according to his education and thinking powers fungi will occupy a larger and larger place in his thoughts and scheme of work. Fungi are present everywhere and have been responsible for producing blights, diseases and loss of crops for all time. In the past it was deemed a sufficient explanation to say that a blight had attacked a crop, and there the matter ended. Now, however, both the agriculturist and the man of science require much more information than this: the former looks to the latter to investigate the causes of 'blights' in the hope that both may understand the nature, habits and tactics of their enemy, and that thus knowing, they may devise methods of defence.

In order to have a clear idea of the manner in which a fungus grows, it is necessary first to consider the manner of life of ordinary green-leaved plants, for it is the differences in the way of feeding exhibited by green-leaved plants and fungi which make the latter such dangerous enemies.

You are all aware that the seed of a green-leaved plant, such for example as that of corn or pigeon pea, when sown in ordinary ground will grow and complete the cycle of its existence when supplied with the mineral salts of the soil together with water, air and sunshine, and that this would take place with proper precautions even if the soil contained no organic matter. In other words, green-leaved plants are able to live and grow when supplied with air, sunshine, water and mineral substances only. They can live without the aid of organic substance, that is, of any substance which has previously existed in a living state.

Now fungi cannot do this; they must have organic matter of some kind to feed on; in the presence of mineral matter alone, even if they have moisture, light and air they fail to grow.

Experiments have clearly demonstrated that the power or energy which enables green-leaved plants to thrive and grow from mineral matter, air and moisture is derived from sunlight, hence these plants quickly become sickly and die if they are deprived of sunlight. Fungi, on the other hand, derive their energy from organic matter and do not require the aid of sunlight to enable them to thrive and grow; indeed sunlight is often harmful: most of the fungi prefer the dark.

Here then we have the essential difference between a fungus and most other plants. The fungus must have organic matter to live on, and hence fungi in various forms attack our most treasured possessions, our food, our clothing, our crops and sometimes even the bodies of ourselves and our animals. Some fungi live on dead organic matter and some only on living, while some are impartial and live on either. This is the key to their destructiveness: they must have organic matter.

The effect of fungi thus feeding is to cause those changes which we commonly describe under the terms rotting or decay, for which changes fungi are, together with bacteria, responsible.

After this statement concerning the general economy of fungoid life, it will be well to inquire somewhat into the structure of the fungus, how it grows and how it propagates itself. I may however at once state that over 40,000 species of fungi have already been described, with possibly as many more as yet unknown, and that these exhibit the most wonderful variety of structure and manner of growth; it will only be possible therefore to-day to describe one or two of the commonest forms of fungi as illustrating the broad general principles.

Fungi originate from small bodies which stand in the same relation to the main plant that seeds do to ordinary flowering plants. We might conveniently call them the seeds of the fungus, but that botanists would quarrel with us because they differ in structure from true seeds, so we must call them spores; but I would have you remember that they are virtually fungus seeds. These spores are usually formed in enormous numbers by each fungus and are many times more numerous than the seeds of the most prolific plant, hence the fact that fungoid growths often spring up in prodigious numbers.

When a spore falls upon suitable conditions as regards warmth and moisture it germinates, much as a seed does. Upon germination, a thin delicate tube grows out from the spore. This continues to grow, to become branched forming a vast network, absorbing its food from the stratum upon which it rests, thrusting the branches of its threads into crannies and crevices, and at times even penetrating the tissues of the organic substratum from which it is deriving sustenance. These thin, delicate threads are known individually as *hyphae*, and collectively as *mycelium*.

Some fungi may continue to go on growing in this way for a long time without showing any tendency to produce spores. In many instances the tendency to form spores does not arise until the supply of food or of moisture begins to fail, then the fungus sets about the business of spore formation in order to provide for a fresh growth of fungi, to perpetuate the race.

The methods of spore formation are extremely numerous and some fungi are able to adopt several methods, which fact enables them to fit themselves to the most diverse conditions, rendering it difficult to devise methods for their eradication.

We may conveniently study the method of spore formation in one of the most common fungi. Everyone is familiar with the green mould which forms upon bread, upon boots, and upon most other things which may be left in places in anyway damp. This is a growth of common fungus called *Penicillium*. If we examine around the margins of the mouldy spot we shall see the white branching threads, the *hyphae*: the whole network of *hyphae* is the *mycelium*. Here and there we can see certain threads which have grown upright into the air instead of creeping along upon the substratum upon which the fungus is growing. These upright threads have no part in the feeding operations of the fungus; they are specialised to bear spores. In a short time the ends of the erect threads become branched into a number of fine threads, and these are in turn divided by numerous constrictions into a number of bead-like spores. These spores are separated from the parent plant by the slightest touch, or by the lightest currents of air, and are thus carried or blown by the wind in every direction and to considerable distances, as is witnessed by the fact that there are few places where this green mould will not make its appearance under circumstances which favour its growth, thus proving the practical omnipresence of its spores.

In other cases the ends of the spore-bearing *hyphae* are provided with minute capsules in which the spores are contained. When ripe, these capsules burst, scattering the spores which germinate when meeting with suitable conditions. A fungus of this kind is the white one commonly seen upon mouldy bread, or other substances containing sugar or starch. With a pocket lens the spore-bearing organs can be easily seen and are readily recognized from their resemblance to minute pins, the capsules holding the spores resembling pin heads.

The fungi already mentioned are very small, requiring the aid of a pocket lens or of a microscope that they may be distinctly seen. We frequently come across much larger fungi in the shape of mushrooms, toadstools, puffballs and other forms. These larger manifestations are the spore-bearing organs of fungi whose main part consists of minute vegetative *hyphae* like those of the moulds already described.

Upon examining a mushroom or toadstool, we find an umbrella-shaped structure beneath which are a number of gills, or plates, radiating. The spores are borne upon the surfaces of these gills; they can be readily seen by placing a toadstool upon a sheet of paper. Passing the stalk through a hole in the paper after a few hours, large numbers of very minute brown spores will be found as a dust-like layer upon the paper. Each of these spores is capable of germinating and of reproducing a growth like that of the parent fungus from which it came. An inspection of the dust-heap so collected and an appreciation of the enormous number of spores contained in it will convince anyone of the enormous power of reproduction possessed by fungi, and will lead him to understand why so much stress is laid upon the destruction of diseased material likely to contain fungi or their spores.

Some of the fungi of this mushroom class constitute formidable diseases. I need only remind you that the 'root disease' of sugar-cane is due to one of them, *Marasmius*. I spoke of this disease at our last regular meeting and suggested that experiments should be tried with certain remedies. I should be greatly interested to learn whether any planter has yet instituted any experiments.

Many of the diseases of timber-trees and of fruit-trees may be traced to fungi of this kind. In addition to the damage done to sugar-cane, West Indians may be on the alert to discover pests of this kind attacking cacao, coffee and other valuable trees. But what I want you to observe particularly, is that it is not the mushroom part of the fungus which causes the disease: that part is concerned with the production of spores for the propagation and spread of the disease. The disease, the rotting, the decay, are caused by the small invisible threads, the *hyphae*, feeding in darkness on the tissues of the plants.

I fear that I should exhaust your patience were I to dwell longer this afternoon on the different forms and phases of fungoid life. I hope however, that this imperfect sketch may serve to make clearer to some of the practical men here present, the manner of life of some of their deadliest enemies, and I would strongly urge upon these practical men the desirability of studying the history of the pests which they have to combat, for they can be vanquished only by *protective* measures. So far as I know there are no cures, no remedial measures which will eradicate a fungus when once it has taken possession of a plant and sent its *hyphae* down into its tissues; any remedy which will kill the fungus, will kill the plant on which it grows. Safety lies in preventing attack, and prevention can only follow knowledge of the manner in which attack occurs.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown

TRINIDAD—J. Russell Murray, Port-of-Spain.

BARBADOS—T. S. Garraway & Co., Bridgetown.

ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—January 20, 1903.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co., Messrs. Kearton Piper & Co., 'The Gardeners' Chronicle,' January 17, and 'The Public Ledger,' January 17, 1903.

Aloes—Curaçoa, 14/- to 40/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 3*d.* to 5$\frac{3}{4}$*d.* per lb.
Balata—Demerara Sheet, 2/5 to 2/5$\frac{1}{4}$ per lb.
Bees-wax—£8 10*s.* per cwt.
Cacao—T'dad, 58/- to 69/- per cwt. ; Jamaica 52/- to 56/- per cwt.; Grenada, 52/- to 59/- per cwt. ; Dominica, 52/- to 57/- per cwt.
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 37/- to 59/- per cwt. Business restricted.
Cotton—West Indian, 4$\frac{7}{8}$*d.* to 5$\frac{7}{16}$*d.* per lb.
Fruit—
Bananas—10/- to 13/- per bunch.
Oranges—10/- to 12/- per case.
Pines—1/6 to 3/6 each.
Fustic—Quiet.
Ginger—Jamaica, 37/6 to 38/- per cwt.
Honey—Jamaica, 17/- to 18/6 per cwt.
Kola Nuts—1*d.* to 4*d.* per lb.
Lime Juice—Concentrated, £11 10*s.* per pipe.
Logwood—In quiet demand.
Mace—1/4 to 2/6 per lb.
Nitrate of Soda—Agricultural £9 7*s.* 6*d.* per ton.
Nutmegs—74's. @ 1/8, 78's., @ 1/4, 91's. @ 1/1 tc 1/2.
Pimento—2$\frac{1}{4}$*d.* to 2$\frac{3}{8}$*d.* per lb.
Rum—Demerara, 8*d.* to 10*d.*; Jamaica, 1/7 to 7/- per proof gallon.
Sugar—Muscovado 10/9. Crystallized 14/- to 15/9 per cwt.
Sulphate of Ammonia—£12 5*s.* to £12 6*s.* 3*d.* per ton.

New York,—January 23, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, 70c. to 75c.; eight hands, 50c. to 55c.
Cacao—African, 12$\frac{1}{4}$c. to 12$\frac{3}{4}$c. ; Caracas, 15c. to 20c. ; Jamaica, 10$\frac{3}{4}$c. to 12$\frac{3}{4}$c., ; Grenada, 12$\frac{1}{4}$c. to 13c. ; Trinidad, 12$\frac{3}{4}$c. to 14c. per lb.
Cocoa-nuts—Trinidads, \$15.00 to \$18.00 ; Jamaicas, \$20.00 \$22.00 per M.
Coffee—Rio, good ordinary 5$\frac{1}{4}$c. ; Jamaica, fair to good ordinary 5$\frac{3}{4}$c. to 9c. per lb. ; Manchester grades 8$\frac{1}{2}$c. to 10$\frac{1}{2}$c. per lb.
Grape Fruit—\$4.00 to \$7.00 per barrel.
Oranges—\$3.75 to \$4.00 per barrel.
Pimento—4$\frac{1}{4}$c. to 4$\frac{3}{8}$c. per lb.
Rubber—Nicaragua scrap 68c. per lb ; Guayaquil strip 63c. to 64c. per lb ; Esmeralda sausage 68$\frac{1}{2}$c. per lb.
Sugar—Muscovado, 89°, 3$\frac{5}{16}$c. to 3$\frac{3}{8}$c. per lb.; Centrifugals, 96°, 3$\frac{7}{8}$c.; Molasses, 89°, 3$\frac{1}{16}$c. to 3$\frac{1}{8}$c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—January 27, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—9c per gallon, package included.
Sugar—\$1.60 per 100 lb.

Barbados,—January 31, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, \$4.00 per 100 lb. Market bare.
Cacao—Dominica, \$12.50 per 100 lb.
Coffee—Jamaica and ordinary Rio \$8.50 to \$9.50 per 100 lb. respectively.
Hay—New Brunswick, 90c per 100 lb.
Manures—Nitrate of Soda \$60.00 ; Ohlendorff's Dissolved Guano \$60.00 ; Sulphate of Ammonia \$80.00 ; Sulphate of Potash \$67.00 per ton. Sheep Manure \$6.00 per ton.
Molasses—No quotations.
Onions—Madeira, \$6.00 ; White \$5.00 per 100 lb.
Potatos—\$1.26 to \$1.44 per 100 lb.
Rice—Ballam, \$4.35 per bag (190 lb.) ; Patna, \$3.50 per (100 lb.); Rangoon, \$2.25 per (100 lb.)

British Guiana,—January 14, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, \$9.00 per barrel.
Balata—40c. to 42c. per lb.
Cacao—native 11c. to 13c. per lb.
Cassava Starch—\$7.00 per barrel.
Cocoa-nuts—\$8.00 to \$10.00 per M.
Coffee—Rio and Jamaica, 11$\frac{1}{2}$c. to 12c. per lb. (retail.)
Creole, 11c. to 12c. per lb.
Dhal, \$3.90 to \$4.00 per bag of 168 lb.
Eddoes—\$1.68 per barrel.
Onions—Retail 3$\frac{1}{2}$c. ; Garlic 7c. to 8c. per lb.
Pea Nuts—Curaçoa, 4c. ; American, 5c. per lb. (retail.)
Plantains—28c. to 40c. per bunch.
Potatos English—\$2.75 to \$3.00 per barrel.
Rice—Ballam, \$4.75 to \$4.80, ex store ; Patna and Seeta, \$5.75 to \$5.90 per bag.
—Creole Rice 18c. per gallon.
Sweet Potatos—Barbados, \$1.68 per barrel.
Tannias—\$2.00 per bag.
Yams—\$2.28 per bag.
Molasses—Vacuum Pan, yellow, 15c. to 16c. per gallon, casks included.
Sugar—Dark Crystals, \$2.02½ to \$2.07½ ; Yellow, \$2.10 to \$2.25 ; Molasses, \$1.40 to \$1.60 (nominal) per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—\$3.00 to \$5.00 per M.

Trinidad,—Messrs. Edgar Tripp & Co., January 28, 1903.

Balata—No quotations.
Cacao—Ordinary, \$12.10 to \$12 30 ; Estates, \$12.80 to \$13.25 per fanega.
Coffee—No quotations.
Onions—\$2.00 per 100 lb.
Potatos English—\$1.10 per 100 lb.
Rice—Yellow, \$4.50 to \$4.60 ; White Table, \$5.20 to \$5.75 per bag.

THE BEST MANURES FOR COLONIAL USE

ARE

Ohlendorff's Dissolved Peruvian Guano—For Sugar-cane and general use

Ohlendorff's Special Sugar-cane Manure

Ohlendorff's Special Cocoa Manure

Sulphate of Ammonia, Nitrate of Soda, Superphosphates, high grades, Potash Salts, Basic Slag and all other high-class Fertilizers.

APPLY TO LOCAL AGENTS OR DIRECT TO

THE ANGLO-CONTINENTAL (LATE OHLENDORFF'S) GUANO WORKS,
London Agency, 15, Leadenhall Street, London E.C.,
Barbados Agents: Messrs. James A. Lynch & Co., Bridgetown.

[33.]

PINE-APPLE SUCKERS.

Fancy Varieties at Greatly Reduced Prices.

Smooth Cayenne
£1 10s. per 100 or £12 per 1,000.

Green Ripleys
10s. per 100 or £4 per 1,000.

Red Ripleys
10s. per 100 or £4 per 1,000.

Carefully packed and delivered in Kingston, Jamaica.

The above are choice plants thoroughly acclimatised to the tropics.

The undersigned has sent Pine-Apple suckers to nearly all of the West Indian Islands and they have given universal satisfaction.

CHAS. EUGENE SMITH,
Barbican, Halfway Tree,
Jamaica, B.W.I.

[23.]

FORTHCOMING AGRICULTURAL SHOWS.

Antigua:—

The Agricultural and Commercial Society have arranged an exhibition to be held at Buxton Grove, St. John's, on Thursday, February 19.

Berbice:—

An Agricultural exhibition is announced for February 18, 19 and 20.

Grenada:—

An Island Agricultural and Horticultural exhibition will be held at Mount Rich estate, St. Patrick's parish, on April 1 and 2.

St. Lucia:—

A Show of Agricultural Produce is announced to be held at the Union Agricultural School on Friday, March 27, by the St. Lucia Agricultural Society.

Trinidad:—

Local Vegetable Shows for the produce of School Gardens will take place in February or March at Tunapuna, Couva, Princes Town and Scarborough. The exhibition for the Tunapuna District will be held on Friday, February 20 at Tunapuna.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL
NEWS.

A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Treatment of Insect Pests.

THERE is hardly any branch of Agricultural work connected with the West Indies that deserves more attention than the successful treatment of insect pests. It is estimated that the total loss to crops attributable to insect pests in each of these colonies amounts to several thousands of pounds yearly. The sugar-cane is attacked by the moth-borer, the root-borer and white and black blights. Orange, lime, and mango trees and cocoa-nut palms are seriously affected by scale insects, cacao by borer beetles and thrips, Indian corn by caterpillars and moth-borer, sweet potatos by a weevil.

The mode of attack and the best method of treatment of these and other pests have received considerable attention at the hands of the Imperial Department of Agriculture.

As pointed out, elsewhere, in these pages probably the simplest way of dealing with insect and other pests is to adopt nature's method and obtain disease-resistant or immune plants, that is, those that do not easily succumb to the attacks of disease. It is hoped by these means to obtain disease-resisting canes as well as disease-resisting coffee, cacao, maize, cotton, sweet potatos, onions.

One of the first insect pests to be exhaustively dealt with by the Department was the moth-borer in sugar-cane. This was discussed in a pamphlet (No. 1, issued in May 1900) and subsequently in an important article in the *West Indian Bulletin*, (Vol. I, pp. 327-53). In these, Mr. Maxwell-Lefroy was, it is believed, the first to point out, exactly, where the eggs of *Diatraea saccharalis* were laid and to complete the life-history of a pest that had caused serious injury to the sugar-cane for nearly a hundred years. The sugar-cane borer can now be effectually dealt with by collecting the eggs, as well as by cutting out 'dead hearts,' that is, the early shoots injured by the grub.

In order to familiarize cultivators with the general methods of dealing with injurious insects there was issued in April 1901 a pamphlet (No. 5.) containing brief directions for the destruction of field and garden pests. It was pointed out that the selection of methods for dealing with such pests depended on a knowledge of the habits of the insects, and that the methods adopted required to be modified to suit the habits of the different insects. It was convenient to attack some insects at one particular stage. Thus, boring insects for instance were often well hidden in their early stages but emerged when they become perfect; then they could be caught. On the other hand, it was easier to destroy the caterpillars that ate some plants than it was to kill the butterflies or moths into which they eventually turned. Occasionally the egg was the most readily-destroyed stage in an insect's life. It was desirable, therefore, that full advantage should be taken of all these points.

Insect pests may be roughly divided into three classes, viz: leaf-eating insects, boring insects and sucking insects. In the first category are numerous caterpillars or 'worms' and grass-hoppers, in the second are the grubs of moths and beetles and in the third are possibly the most destructive insect pests in the West Indies—the plant lice, mealy bugs and scale insects.

Of scale insects there are 120 species known in these colonies and about fifty of these are more or less injurious to economic plants. The prominent position thus shown to be occupied by scale insects led to a special study of this group. In July 1901 there was published (Pamphlet No. 7.), the first part of a study of 'The Scale Insects of the Lesser Antilles.' This contained a description of twenty species of scale insects, together with hints as to preventive measures, remedies, application of washes and a list of the plants more commonly attacked. There is now in the press, and will be issued in the course of a few days, (Pamphlet No. 22.) the second part of a study of 'The Scale Insects of the Lesser Antilles.' These two pamphlets if rightly used should prove invaluable to those whose crops are attacked by scale insects and it is hoped that the preventive measures and remedies suggested, after careful trial of their efficacy, will be generally adopted in these colonies. A fuller and more scientific study of West Indian scale insects is contained in two important articles in the *West Indian Bulletin.* (Vol. III, pp. 240-70 and pp. 295-319).

The attack of thrips on cacao is another matter that has, and is still, receiving attention. It now appears that cacao in nearly all the West Indian Islands is more or less attacked by this pest. It is present in St. Vincent, St. Lucia, Dominica, Guadeloupe and Jamaica. It is hoped it is absent from British Guiana. It is not a very serious pest, except in certain districts in Grenada. Information as to treatment is contained in an article (with woodcuts) in the *West Indian Bulletin* (Vol. II. pp. 175-79).

The further efforts of the Department will now be directed to encourage the practical application in the field and garden of the recommendations contained in the publications above referred to. Spraying machines and insecticides are already in use and it is hoped during the coming year the cultivator will be placed in a better position than formerly in regard to insect pests and as a result that he will enjoy a larger share than hitherto, of the proceeds of his labour.

SUGAR INDUSTRY.

Sugar-cane Experiments at British Guiana.

The last issue of the *Agricultural News* contained on pages 50 and 51, a review of a portion of the Report on Agricultural work in the Botanic Gardens and the Government Laboratory, for the years 1896-1902. We give below a résumè of the results arrived at from the manurial experiments with sugar-cane:—

MANURIAL EXPERIMENTS.

A large proportion of the report is taken up by the results of the manurial experiments, and 'the following are the general deductions as to the action of manures and of lime upon the crops of sugar-canes grown upon very heavy clay-lands and under the climatic and meteorological conditions existing at the Botanic Gardens from June 1891 to May 1902:—

1. Nitrogen in the forms of sulphate of ammonia, nitrate of soda, raw guano, and dried blood exerted a favourable influence upon the yield of the sugar-canes and is without doubt the manurial constituent the supply of which mainly governs the yield of the plant.

2. When supplied in quantities capable of supplying not more than 40 ℔. of nitrogen per acre there was practically no difference in the effects of sulphate of ammonia and of nitrate of soda, but on the whole the former is, in my opinion the preferable salt to apply. Dried blood and raw guano were inferior to each of these. In the earlier crops of the experiments the best results were obtained by a mixture of one-third nitrate of soda and two-thirds sulphate of ammonia, but during the latter years this mixture has not proved more efficacious than either sulphate of ammonia or nitrate of soda alone.

3. Where applied in quantities supplying more than 40 lb. of nitrogen per acre, sulphate of ammonia is the best source of nitrogen for the sugar-cane on the alluvial soils of British Guiana.

4. The sugar-cane made more effectual use of the nitrogen supplied by 200 lb. per acre of sulphate of ammonia and by 250 lb. of nitrate of soda than it did of that supplied in heavier dressings. On the whole, dressings of from 2 to 3 cwt. of sulphate of ammonia per acre appear to be the most certainly profitable applications of nitrogen, although at favourable season the use of still higher proportions may prove successful.

5. The application of superphosphate of lime to plant-canes gave increased yields when added to manurings of nitrogen and potash. But little, if any, advantage was gained by the use of phosphates with ratoon-crops and I am of opinion that manurings with superphosphate of lime or with other manures containing phosphates should be restricted to plant-canes, the ratoons being manured with nitrogen only.

6. Mineral phosphates to give increased yields must be applied to the soil in such heavy dressings as to render their use decidedly unprofitable.

7. As far as the experiments indicate Thomas' phosphate powder (slag-phosphate) is the preferable source of phosphates for application to plant-canes in lieu of superphosphate of lime.

8. The addition of potash when applied either as sulphate of potash or as nitrate has exerted little or no effect. The normal weathering of the constituents of the soil sets free for each crop potash in excess of the quantity necessary for the requirements of the plants. This holds good under the conditions existent here, where the greater proportion of the potash taken up by the plants is directly returned to the soil, but where practically the whole of the produce is removed from the land, it is probable that partial potash-exhaustion may take place in the course of a few crops.

9. The use of lime has resulted in largely increased yields. But whether or not its use will result in profitable increases depends on the price of sugar. Its action appears to have been principally mechanical in improving the texture of the land, and it is a question of much importance whether this effect could not be obtained at a lower cost and hence more profitably by the use of light ploughs or other cultivators.

10. The results confirm those of previous experiments that neither the addition of phosphoric acid, of potash, or of lime to the manures favourably effects the sugar-contents of the juice of the canes. The effects of nitrogenous manurings appear to be to somewhat retard the maturation of the canes and thus the juice of canes manured with them is as a rule not so rich in saccharose as is that of canes grown without manure. But this effect is far more than offset by the larger yields of produce resulting from the application of nitrogenous manures, and to the fact that the increases produced by the nitrogen are principally due to the development of the stalks in length and in bulk and not to abnormal increases in the amounts of tops and leaves or the production of new shoots to the stool. In this the effects of nitrogenous manures on the sugar-cane are very similar to those on others of the *Gramineæ.*

This report contains a very large amount of condensed detail of great interest and forms a valuable contribution to the literature of Sugar-cane Experiments already so largely enriched by its distinguished compiler, Professor J. B. Harrison.

Influence of Light on Golden Syrup.

In the *International Sugar Journal* for January 1903, Mr. Sigmund Stein, the Manager of the Sugar Refinery of Liverpool contributes a paper on the 'Influence of Light on Golden Syrup.' For the last four years Mr. Stein had been studying the problem of how light influences the character of Golden Syrup, and as the result of his experiments he has come to the following conclusions :—

(1) Cane-sugar syrups are inverted by sunlight if exposed to it for a considerable time.

(2) The lower the density of the syrup the more it is liable to inversion by sunlight.

(3) The inversion co-efficient is proportional to the acidity of the syrup.

(4) The inversion co-efficient is in inverse proportion to the amount of organic and inorganic salts contained in the syrup.

(5) The lighter the colour of the syrup the more it is liable to be inverted by sunlight.

Mites in Molascuit.

A sample of molascuit made at Barbados was kept for nearly six months, apparently, in good condition. The only change noticeable in it was a light acidity, probably due to the presence of 'mite.' Specimens of this mite or acarus were forwarded to Mr. A. D. Michael, F.L.S., who has kindly supplied the following particulars :—

> Your acarus from molascuit is *Carpoglyphus anonymus* (Haller *ex* Robin). It is pretty common and lives chiefly on fruit paste and fruit in such condition as French plums, and on drugs made up of such things, but it is also found on flour, cheese, glucose, sugar, etc. It likes its food slightly damp. It has been found on the surface of the sweet wines of the south of France in large quantities, and was supposed to turn them sour. It, at any rate, caused considerable loss to the wine merchants. It will not, I think, hurt the cattle, unless the turning the molascuit sour (if this happens) should be injurious. It does damage wherever it is, but I do not fancy that the damage is usually serious.

West Indian Seedling Canes in Natal.

In June 1901 cuttings of some varieties of West Indian seedling canes were forwarded to the Department of Agriculture, Natal, from Antigua. The cuttings were packed in Wardian cases, and arrived in good condition on the whole. The butts which were imbedded in the soil mostly decayed, but the upper portions were quite healthy with perfect eyes. The Director of the Natal Department had all the canes affected by 'mealy' bug or 'borer' burnt. The remainder were planted. They grew well and have been increased by propagation. At present there are reported to be 450 holes of B. 15, 120 of B. 109 and 270 of D. 95.

The Government Entomologist of Natal who has charge of the canes states that these canes have done better than others imported at the same time from other parts of the world. Field trials and chemical tests have not yet been made, and will be awaited with interest.

DISEASED COCOA-NUT PALMS.

A disease, the cause of which is not stated, is doing some damage to the cocoa-nut trees in Jamaica. The following description of the disease is taken from the Jamaica *Gleaner* for January 12, 1903:—

> The heart leaves drop out and the leaves, which are usually upright, fail down. When a tree in this condition is cut down the heart is found to be one mass of bad-smelling, decaying vegetation, while the root and trunk are in perfect condition. The disease often attacks the flower spikes with the result that many of the cocoa-nuts drop off while still young. This is frequently preliminary to the disease getting to the heart leaves, after which nothing can save the tree.

In the *Journal of the New York Botanical Garden*, Vol. IV, pages 4-7, Mr. F. S. Earle gives an account of his recent visit to Jamaica. He examined cocoa-nut trees suffering from what is apparently the same disease as that described above. Mr. Earle attributes the disease to a bacterium. He points out the necessity for the prompt cutting and burning of all infected trees, and says that 'it is claimed by some planters that a certain green-skinned variety of cocoa-nut is less liable to this disease than the reddish and yellowish kinds.' If this is confirmed there is a possibility of raising a resistant race of cocoa-nuts.

A disease, similar in many symptoms is the subject of a paper in *Bulletin No. 38, New Series, Division of Vegetable Pathology and Physiology* of the United States Department of Agriculture.

The disease appeared among the cocoa-nut palms in the province of Santiago, Cuba. The first indications of trouble was the falling of the young fruit. Shortly after the larger nuts dropped and the leaves assumed a yellowish colour. Within a month all the large lower leaves droop and fall, leaving only the pale, sickly tops which blow over at the first heavy wind. Here also from the root to within a few inches of the top, the trunk was found to be perfectly sound.

Perforating the entire upper part of the trunk for 2 to 12 inches downwards was found the mycelium of a fungus, the fruiting bodies of which appeared as small white spots on the under side of the leaves, these might easily be mistaken for the scale insects *(Aspidiotus)* often found there. The fungus was identified as *Pestallozzia palmarum*.

On breaking open the lower leaves and cutting the centre of the green growing part open, the heart is found to be one putrid, offensive-smelling mass.

It was found that the best way of preventing the spread of the disease was cutting down and burning the diseased palms. It is not necessary to burn the entire trunk, but only the top, with a couple of feet of the upper end of the trunk. In order that this preventive measure may have its greatest effect, it is absolutely necessary that united action should be taken. It would obviously be futile for the proprietors of one estate to eradicate the disease within its limits, if the owners of neighbouring estates omit the precautions and allow the disease to multiply and send its spores abroad to the others.

These two diseases are so similar in their symptoms that it would seem not improbable that they are really one and the same. This, however, cannot be definitely settled until something more is known of the cause of the disease in Jamaica. We trust fuller information will be obtained as the result of the work which we understand Mr. F. S. Earle has in hand at the New York Botanical Garden, and of the field experiments of Mr. W. Cradwick of the Department of Agriculture, Jamaica.

DISEASE-RESISTANT PLANTS.

In the *Agricultural News* (Vol. I. p. 85) attention was drawn to the success achieved by the United States of America Department of Agriculture in raising disease-resistant varieties of cotton and cowpeas. In his Report for 1902, the Secretary of the Department discusses this important question in the following words:—

> The most practical way to fight disease is to use nature's method and get disease-resistant or immune plants. Striking success has been achieved by the Department experts in this line. The development of cotton-resistant to wilt disease is now an assured fact and has been taken hold of by the planter on a large scale. Large tracts of land in the Sea Island district of South Carolina which had been abandoned on account of this disease were planted the past year successfully with resistant strains of cotton, and good crops secured.
>
> The discovery during the past year of a variety of cowpea—'Little Iron—resistant to 'wilt' and 'root-knot' (two of the worst diseases of this important crop in the South) is a matter of great importance to Southern agriculture, where the need of leguminous crops for forage and soil improvement is especially felt. Thirty bushels of seed of this resistant variety were distributed during the past year.
>
> Satisfactory progress was made during the year in securing varieties of cotton resistant to the Texas root-rot, and some evidence was obtained that varieties may be developed resistant to the dreaded cotton boll weevil.

THE VALUE OF GOOD PACKING.

The question of good packing of fruit is no new topic in the *Agricultural News.* The following extract from Mr. W. B. Gill's Pamphlet on *Jamaica Fruits in British Markets*, merely furnishes another instance of the results which can be obtained by scrupulous care in packing:—

'I wish it were possible for me to convey accurately to the minds of my readers the appearance of a large consignment of apples from Tasmania which I had an opportunity of inspecting at the White Star Company's docks. There were scores of cases opened for inspection and perhaps thirty or more varieties. The fruit was all beautifully wrapped and packed in small cases and looked just the same as if it had been freshly picked in the orchard. I never saw one apple even specked or spotted, much less completely bad, and yet it was over two months since the fruit left the orchard. I understand this is quite a new industry, and from the fancy prices which these apples are bringing in the English market, is still further proof that it is the packing and the condition which cause them to sell freely. The usual retail price of this fruit is about sixpence a pound and yet in size and appearance I do not think these apples begin to compare with Canadian and American which can be bought for less than half the price. The latter fruit is generally shipped in barrels, loosely and without any grading or wrapping or other attention, while the Tasmanian fruit is put into oblong cases holding about a third of a barrel, and each apple separately wrapped in paper.'

PRODUCTION OF WEST INDIAN TOBACCO.

The following table, showing the average annual production of leaf tobacco, cut tobacco, cigars and cigarettes in each of the undermentioned West Indian islands, is quoted by the *Board of Trade Journal* from a recent report by the Belgian Consul-General for the Antilles. One kilogram we may add equals $2\frac{1}{5}$ ℔. avoir.

	Leaf Tobacco.	Cut Tobacco.	Cigars.	Cigarettes.
	Kilogs.	Kilogs.	Kilogs.	Kilogs.
Cuba	20,000,000	250,000	1,200,000	10,000
Porto Rico ...	2,800,000	—	—	—
San Domingo ...	8,000,000	—	—	—
Jamaica	20,000	—	14,000	4,000
Total	30,820,000	250,000	1,214,000	14,000

DWARF BLACK PEPPER.

This interesting plant has been in cultivation at the Botanic Station at Grenada for many years. Mr. W. E. Broadway, the Curator, has contributed the following notes:—

The ordinary black pepper is a strong climber reaching the tops of high trees. The present variety is a non-climber. In the Station it is cultivated at the base of an old Saman stump. The climbing peppers give irregular crops whilst, on the other hand, this dwarf variety never fails to produce, annually, its strings of berries. The low habit is very convenient for gathering the crop. Plants of this pepper have been distributed to the Botanic Station, St. Lucia.

CACAO.

EXPERIMENT PLOTS AT GRENADA.

The following summary is taken from the report of Mr. M. McNeill, Agricultural Instructor at Grenada, on the cacao experiment plots in that colony. The information given refers to the period from October 1, 1901, to September 30, 1902. The report is published in full in a recent issue of the Grenada *Government Gazette*:—

The following is a comparative statement of the yields for 1900-01 and 1901-02:—

	1900-01		1901-02.	
Vendome (1 acre) ...	421	℔ wet cacao.	1561	℔ wet cacao.
Colombier (,,) ...	564	,,	1117	,,
Vincennes (½ acre)...	340	,,	879	,,
Nianganfoix (1 acre)	3335	,,	3989	,,
Bellevue (,,)	1611	,,	2087	,,

The yield for Vendome and Vincennes is three times greater than last year, about double for Colombier, with a decided improvement for Bellevue and Nianganfoix.

Average cost of working per acre for 1901-02, including cost of manures, cartage, etc., has been £5 17*s.* 0*d.*

The average cost of production per cwt., allowing for wet cacao to give half its weight in dry, on which, however, there is at present wide differences of opinion has been 12*s.* 9*d.*

Summary of manurial results:—

	Vendome.	Vincennes.	Colombier.	Nianganfoix	Bellevue.	Totals.	
Basic slag and sulph. potash	522	279	340	1109	561	2811	℔ wet cacao
,, ,, ,, ammonia	426	252	252	1202	613	2745	,, ,, ,,
,, ,, nitrate of soda	251	200	307	1021	420	2199	,, ,, ,,
Sheep or pen manure ...	362	148	218	657	493	1878	,, ,, ,,

Basic slag and sulphate of potash sections have taken first place in three plots and second place in two.

Basic slag and sulphate of ammonia sections have taken first place in two plots, second in two, and third place in one.

The total yield for the basic slag and nitrate of soda sections has been better than that for the sheep or pen manure sections.

'FAULTLESS' SPRAYER.

Considerable interest has recently been aroused in the West Indies on the subject of insect pests and their treatment. Inquiries have repeatedly been made at the Head Office of the Imperial Department of Agriculture for a sprayer, suitable for use in small vegetable gardens and conservatories at a cost within the reach of everyone. A machine has recently been imported from the Western States by Mr. George S. Hudson, the Agricultural Instructor at St. Lucia, which appears to fulfil these requirements. It is known as the 'Faultless' Sprayer and is manufactured by the A. I. Root Company, Medina, Ohio, U.S.A. It is said to be especially adapted for spraying potato vines, small shrubs, house plants, trees, and poultry. About this sprayer Mr. Hudson writes as follows:—'The 'Faultless' is an excellent little sprayer, costing only 4*s.* each in brass and 2*s.* in tin, and will, I think, be a great aid to the practical application of Mr. Lefroy's remedies for Insect Pests.' It may be added that Mr. Hudson has at present numbers of these sprayers and is prepared to supply them for experiment purposes at the prices above mentioned, plus cost of freight and duty. Any person desiring to obtain one of these machines should communicate with Mr. Hudson at Errard Estate, St. Lucia.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 79 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. II. SATURDAY, FEBRUARY 28, 1903. No. 23.

NOTES AND COMMENTS.

Warning against a 'One Crop' Policy

The following extracts are taken from a leading Texan newspaper, the *Waco Tribune.* In this particular instance the too exclusive cultivation of cotton is discouraged, but similar remarks apply to any industry that is overbalanced in its relation to the production of food and forage crops:—

'All Cotton' as a crop policy will have to be modified in Texas. Nature intended cotton should be raised here and in generous quantity, but we have gone too far on the 'All Cotton' road. Plant for enough corn and forage first, for enough meat—and then for cotton.

With enough corn, meat and forage the Texas farmer can get along, even if cotton is cut short. But where he has to buy the greater part of the corn he needs and all the meat he uses times are hard for him —even if it is a good cotton year.

Be sure and plant a sufficiency of corn next year. No matter how bountiful the cotton crop, no matter if cotton prices are good, farmers see hard times when the yield of corn is not up to the needs of the people. Bread is the staff of life.

Raise hogs. They bring good prices all the time. A fat hog is cash, any day in the week, as much so as cotton. Cotton weevils never prey on hogs.

Put in forage crops next year. When there is a sufficiency of forage for live stock the farmer has more money to spend for other things.

Lady Bird Beetles and Scale Insects.

In St. Lucia a lady bird beetle was recently observed eating scale insects, and appeared to be sufficiently useful to be worth spreading to other localities as a check on these troublesome pests. A first consignment of living beetles and their grubs was received at Barbados on February 8, from St. Lucia. They arrived in good condition and were liberated the next day in the grounds of Queen's House. The beetle is of a steel blue colour, with small red spots on the head, and is a little larger than the small red lady bird beetle found so commonly in Barbados. It feeds on a variety of the common scale insects that attack mango, citrus and other fruit trees. Persons who may see it are requested not to destroy it in mistake for a pest, for we are anxious that this creature may increase and become established.

Spare the Birds.

In a recent publication devoted to the interests of planters in the Southern United States the following interesting facts are placed on record respecting the value of birds in destroying insects injurious to crops:—

> 'In a single day the stomach of a single quail contained 101 potato beetles, and that of another quail 500 chinch bugs. A yellow billed cuckoo shot at six o'clock in the morning contained 43 caterpillars, and another cuckoo 217 web worms. A robin had eaten 175 caterpillars. The stomachs of four chickadees contained 1,028 eggs of the cankerworm. Four others contained 600 eggs and 105 mature insects, and it is said that a single chickadee will eat 5,000 eggs of this worm in a single day. It has been estimated that a barn swallow will destroy from 5,000 to 10,000 flies and other insects every week. The crop of a dove contained 7,500 weed seeds.'

There are numerous West Indian birds equally useful, every one of which should be cherished and preserved We drew attention in the *Agricultural News* (Vol. I., p. 246) to the useful part played by the Barbados blackbird in helping to destroy a pest of Guinea grass.

Fancy Work and Curios.

Recently we observed in these pages:—'The present age is one in which there is a great demand for curios and the increasing number of winter visitors to these colonies should enable aged people, and those who are only able to follow light, sedentary occupations, to establish quite a small industry in mounting and preparing the ornamental seeds of the West Indies.'

At Jamaica a Women's Self Help Society, founded in 1879 by Lady Musgrave, is doing excellent work in this direction. It supplies a large assortment of ornamental articles made from seeds, fruits and ferns entirely prepared by its members. The society is possessed of a substantial building that has cost £900, free of debt. A similar Society has lately been founded at Trinidad by Lady Moloney. At Jamaica during the visit of s. s. *Argonaut*, in January, the Self Help Society 'took close upon £80 as the result of one day's sale.' A fortnight ago on the occasion of the visit of the Hamburg-American s. s. *Moltke* the sale for two days reached nearly the same amount. That is a total of nearly £160 in three days. There is evidently something to be done with our unconsidered trifles if only deft hands and skilful brains are trained to present them in an attractive and artistic manner.

Travelling Instructors.

Reference has already been made in these pages to the appointment of two travelling Instructors in Trinidad. The report of Mr. William Leslie, one of these officers, for the month of January last, indicates that the movement is being warmly received by planters and others in that colony. Alluding to his visit to the Cedros district, Mr. Leslie writes:—

> Most of the planters I met showed much interest in my mission, helped me in various ways, and appreciated the lectures and experiment plots. . . . From the teacher of Cedros Government School I learnt that the boys there took up agriculture heartily and were much interested in the cultivation of the garden. This garden was well fenced and several plots were laid out. . . . At Matura I also visited the school where the teacher, Mr. Rogers, showed me a very creditable garden with well tilled plots of vegetables.

Cultivating Yams in Britain.

In a recent number of the *Journal of the Society of Arts*, a writer recommended 'the introduction of yams in order to make up for the partial failure of the potato crop in 1902.' In the *Journal* for January 23, Mr. George Bunyard, chairman of the fruit and vegetable committee of the Royal Horticultural Society, gives his experiences in this connexion. He cultivated a hardy variety of yam from China and Japan, and obtained some tubers. 'When cooked they proved to be less tasty than a bad waxy potato.' He adds: 'I have not tasted yams in the tropics, or come across South American sorts cooked in England, but if asparagus is cynically called an excuse for wasting good butter the *Dioscorea* deserves greater condemnation.' There is room for the yam as an import into Britain, but it is very unlikely that it would grow to perfection during a short British summer. Excellent yams, of the best West Indian varieties, are now being shipped to England from Barbados and sell there for less than it would cost to grow them.

The Board of Trade and the Imperial Institute.

In consequence of the transfer of the Imperial Institute to the Board of Trade from the beginning of the present year, the work formerly carried on by the Commercial Intelligence Office of the Imperial Institute is now conducted by the Commercial Intelligence Branch of the Board of Trade.

The Commercial Intelligence Branch is also in communication with the Imperial Institute at South Kensington, of which Professor Wyndham Dunstan, F.R.S., has been appointed Director by the Board of Trade. Among the branches of work in charge of Professor Dunstan are the scientific investigation of the economic products of the British Empire with a view to their commercial utilization, and the superintendence of the arrangement and classification of the collections of these products which are exhibited at the Institute.

Recent Department Publications.

During the past fortnight the Imperial Department of Agriculture has issued a report on the *Soils of Dominica* by Mr. Francis Watts, also the *Annual Report* on the Experiment Stations, Montserrat. The two publications are reviewed on page 75 of this number. Pamphlet No. 21, entitled *Cotton and Onion Industries in the West Indies*, was published in time for last mail. Pamphlet No. 22, *Scale Insects of the Lesser Antilles*, Part II. by Mr. H. Maxwell-Lefroy is almost ready. This forms the completion to the previous pamphlet on the same subject (No. 7.) and contains an account, illustrated with drawings from life, of thirty-one species of scale insects not included in his earlier pamphlet.

The concluding part of Volume III. of the *West Indian Bulletin* has also been published. It contains papers on the 'Scale Insects of the West Indies,' 'The Birds of Barbados,' 'Green Sorghum Poisoning,' 'Climatology of Antigua,' 'West Indian Fodders,' etc., and also the index and title page to the whole Volume.

All the above mentioned publications can be obtained from the agents of the Department at nominal prices.

The 'Dominica Agriculturist.'

The most recent addition to the agricultural journals of the West Indies is the *Dominica Agriculturist*, the 'Journal of the Dominica Agricultural Society,' edited by Dr. H. A. Alford Nicholls, C.M.G.

No. 1 gives an account of the meetings of the Society in 1900, and contains papers by Mr. Francis Watts, Mr. D. Tannock, the editor and others. We heartily wish the new journal a long and useful career.

Title Page and Index.

The title page and index of Volume I of the *Agricultural News* are now in the printer's hands, and we hope to issue them as a supplement to our next number. As announced in the last issue of this journal, copies of the first part of Volume I are now scarce. Readers having copies of this part, to spare, are requested to send them to the Curator of the Botanic Station in their island who is authorized to pay 3*d.* for each clean copy until further notice.

WOUNDS AND WOUND PARASITES.

Most of the important fungoid stem diseases of cultivated plants in the West Indies are caused by wound parasites. These fungi are incapable of entering the tissues of a plant while this is protected by its normal covering of bark. When, however, these spores are blown or carried on to a part of a plant which has been stripped of its normal covering, they are capable of developing, and then attack and destroy the underlying tissues of the plant. As an example of this group may be mentioned the 'canker' disease of cacao trees, caused by a fungus known as *Nectria*. The fungi are as a rule able to live and produce their reproductive organs on dead pieces of wood, etc., lying about on the ground.

Fungi attacking stems cause loss to the host plant in many ways. In the first place, they attack and destroy the actively dividing part of the stem and so prevent the growth in thickness of that part of the stem attacked, so forming 'cankers.' Their hyphae enter the vessels of the wood, the water-conducting tubes of the plant, fill these and so prevent a sufficient supply of water and mineral salts reaching the leaves. Their action here may be compared to the matted roots of trees which are found in drain-pipes, etc., stopping the flow of water. Again they behave in the same way in the conducting vessels (sieve-tubes) of the bark, and so prevent the elaborated food from the leaves reaching those parts of the plant below the diseased area. Often they attack the hard walls of the elements of the wood and render these soft and powdery. In this way the tree is much weakened, and, besides, the wood itself is rendered useless for economic purposes. In plants like the sugar-cane, which store sugar, etc., in their stem, the fungus will attack and destroy these reserve foods.

Wounds are formed in various ways. High winds, severe storms, boring insects, the fall of other trees, rolling stones, etc., on hill sides may be described as natural causes; while careless pruning and fruit picking are often artificial and unnecessary causes of wounds. The smallest wound, however caused, unless properly treated, is a possible open door for the entrance of dangerous wound parasites.

TREATMENT OF WOUNDS AND WOUND PARASITES.

When the stem of a woody plant is injured, the plant itself takes measures towards healing the wound. Some plants secrete gums or resins into the injured area which hardens and so forms a protective coat; other trees are not able to do this and they proceed to cover up the wound by the formation of a corky tissue; this is, however, a slow process and often wound parasites are well established long before the wound has been healed.

In pruning trees great care should be taken. When branches are cut off, this should be done as near the parent stem as possible; the cut surface should be clean, and should slope in such a way as to allow water to run off it easily.

When a wound has been made, either in pruning or accidentally, steps should be taken to prevent the entrance of fungus spores until the plant has had time to form its protective tissues. This can easily be done by coating the cut surface with tar. In the case of jagged and rough wounds, these should be trimmed with a sharp knife or cutlass to give the plant a better chance of forming protective tissues.

Once a wound parasite has entered and developed it is a difficult matter to extirpate it. This may sometimes be done by cutting out the diseased area with a sharp knife, and tarring the freshly cut surface.

Spore-bearing parts of the parasites, when they appear, should always be cut out and burned to prevent the infection of neighbouring trees.

All dead remains of plants which are infected should be burnt, otherwise they form nurseries for the cultivation of fungi. In the same way, rotten canes which have been attacked by the 'rind fungus' should be burnt, or at least, should be crushed and the megass burnt.

Sometimes wounds are caused by boring insects. In such cases the methods recommended for the control of these insects will also attack the wound parasites which follow them.

MOSQUITOES.

New comers to the tropics are apt to suffer from the bites of mosquitoes even by day, but especially in the evening, out of doors. Sandflies and midges are also frequently troublesome on the sea shore or near ponds and not every one can adopt the simple precaution of smoking a pipe or cigar to keep off these unwelcome insects. Whilst in America, the writer (Mr. H. Maxwell-Lefroy) visited the woods of New Jersey in company with an enthusiastic insect collector, and the mosquitoes, which are a famous New Jersey product, were very troublesome during the whole day unless a pipe was kept constantly in action. The writer's companion recommended rubbing a little citronella oil on the face and neck as a substitute for continual smoking and this proved effective. The same simple remedy was repeatedly used in Barbados. A few drops of this oil rubbed on the face, neck and hands have a considerable deterrent effect on mosquitoes, and by this means it was found possible to do without a mosquito net at night. The oil has a fragrant odour, in no way unpleasant, and this odour does not persist, or become distasteful.

Dr. Ronald Ross mentions kerosene oil and lavender oil as being used in this way. Citronella oil appears to be equally efficacious, and certainly has not the unpleasant and persistent odour of kerosene oil.

Citronella oil in one instance proved ineffective in the case of a person very susceptible to mosquito bites, so the remedy may be accepted with caution. It is certainly worth a trial by anyone who suffers from mosquito bites and any disadvantages in the use of it are, in the writer's opinion, amply made up for by the removal of the mosquito net.

AGRICULTURAL SOCIETIES.

Dominica.

Mr. A. K. Agar, Honorary Secretary of the Dominica Agricultural Society writes:—

A largely attended meeting of the Society was held on January 31. The Secretary's and Treasurer's Reports for the past year, were read and adopted, and the officers for the present year were elected. They are the same as for 1902, except that Dr. Nicholls retired from the Council and Mr. De Souza was chosen to fill the vacancy.

The Hon. F. Watts was present and addressed the meeting. He touched on various points, such as artificial manures, clean tillage, the use of weeds as manure, the necessity for carefully carried out experiments and the general discussion of their results, and the use of sulphur as a fungicide.

Several questions were put to Mr. Watts, and after a general discussion the meeting rose.

Antigua.

At a meeting of the Antigua Agricultural and Commercial Society on February 6, the following resolution was unanimously passed:—

'That this Society desires to express its best thanks to the Imperial Department of Agriculture for the West Indies for the excellent Short-horn bull and the high-class poultry recently presented to the Skerrett's Stock-farm, which stock will be of great value to the large and small stock-breeders of the island.'

THE SISAL HEMP INDUSTRY.

The Secretary of the United States of America Department of Agriculture in his Annual Report for 1902 says:—

The demand for sisal for the manufacture of binding twine is rapidly increasing, owing largely to the advent of the corn binder. The sisal plant is very exacting in regard to the conditions under which it may be cultivated successfully, and, as the areas having the proper conditions for its growth are comparatively limited, it is of the utmost importance to our American consumers of binding twine, as well as to the fibre producers in our tropical territories, that land suitable for the growth of the sisal plant be utilized so far as possible. These facts have been accentuated by the high prices paid for sisal fibre during the past year. A brief investigation has been made of the sisal industry in the Bahamas, where the conditions are somewhat similar to those in Porto Rico. Some sisal plants from the Bahamas have been sent for trial to the Porto Rico experiment station at Mayaguez. There seems to be little doubt that the sisal plant can be successfully cultivated in limited areas in Porto Rico, as it is now being cultivated in Santo Domingo. It has been introduced into Hawaii, and the first commercial crop has been harvested there during the past season, the fibre produced finding a ready market at good prices at San Francisco.

EDUCATIONAL.

Antigua.

Writing in reference to the recent appointment of Mr. A. H. Kirby as Agricultural and Science Master at the Antigua Grammar School in connexion with the Imperial Department of Agriculture, the Rev. S. E. Branch states:—

'I feel that by the generous help of the Department I am enabled to place the school on a thoroughly good basis to meet the requirements of modern education and specially the requirements of our islands. The boys of this school are obtaining advantages which no one in Antigua has ever possessed before, and if they take advantage of the education now offered them they ought to be well equipped for whatever sphere of life they afterwards may venture on.'

Grenada.

Mr. J. Harbin, Inspector of Schools for Grenada, in the course of his Annual Report for 1901, says:—

No steps have yet been taken by the Board of Education to approve of the use of Blackie's *Tropical Readers* so highly recommended by the Imperial Department of Agriculture, and no further time should be lost in so doing. At the time of writing I am in a position to be able to state that the Board of Education at their last meeting considered how, from money at their disposal, they might assist those managers who can secure plots in properly fencing them, and in enlisting the services of the Agricultural Instructor in selecting the best sites for school purposes, as they were unanimous in concurring with Dr. Morris' view that a plot unfenced is as good as useless.

. . . . Since the delivery of the first course of lectures by the Imperial Department of Agriculture, the teachers have been teaching from their notes taken at the lectures and corrected by the lecturer, and, as a consequence, the instruction imparted has been much more definite and to the point, the difficulty of teaching from text-books what they did not very well understand being thus obviated. One decided advantage of teaching from these notes is that the teachers eventually learn thoroughly all that has been committed by them to paper. The results of the examinations are distinctly satisfactory so far, and about three boys, on an average, between the ages of fourteen and eighteen, leave each school annually with a fair elementary knowledge of plants and plant life capable of being turned to good account in a small garden.

DEPARTMENT NEWS.

The Hon. Francis Watts has lately visited Montserrat and given close attention to the agricultural operations carried on at the Experiment Stations in that island. He has also taken part in the instruction given in connexion with school plots. It is proposed to initiate preliminary experiments at Woodlands with manures for arrowroot.

Mr. David Tannock, officer in charge of the Agricultural School at Dominica, under the Imperial Department of Agriculture, has been appointed Superintendent of the Botanic Gardens and City Reserves at Dunedin in New Zealand. Mr. Tannock will vacate his present appointment early in April next.

DEPARTMENTAL REPORTS

Sugar-cane Experiments at Barbados.

PROGRESS REPORT, JULY 1, TO DECEMBER 31, 1902.

The following Progress Report, for July to December 1902, on the Sugar-cane Experiments carried on in Barbados under the direction of the Imperial Department of Agriculture, has been prepared by Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., and Mr. J. R. Bovell, F.L.S, F.C.S., the officers in charge of the experiments:—

Since the last report was issued it has been decided that for the future the reports shall be issued half-yearly, and only deal with the work carried on during the half-year reported on.

As the last report, although extending beyond the time when the majority of the plots to be reaped in 1903 were planted, did not take these into consideration, it is necessary in this report to review the work done from December 1901.

For the period under review, that is, from the beginning of December 1901 to December 31, 1902, there are 8,985 experiments covering an area of 210 acres to be reported on.

The experiments may, for the sake of convenience be divided into two groups. The first group being the experiments which will be brought to a close at the end of the next reaping season, and the latter those which will end either during December 1903, or at the end of the reaping season of 1904.

The following is a detailed list of the stations of the first group giving the number of plots and areas under experiments.

EXPERIMENTS WITH MANURES.

Of the 620 small manurial experiment plots, covering an area of twenty-one and a half acres, twenty-six are in 'Summervale' field at Dodds, 248 in 'Johnnie King' field at Foursquare, and 346 at Hopewell. Of these latter the twenty-seven in 'Fletcher' field are plant canes, the 173 in 'Ayshford Hill' field first ratoons and the 146 in 'Hopper' field second ratoons.

By the kind permission of Mr. A. Cameron, sixty-seven manurial plots of one acre and upwards, extending over an area of seventy-five acres, have been established on the estates belonging to Messrs. T. Daniel & Co., Limited, and the Rev. Henry Daniel and others. Of these nineteen are at Foursquare, thirty-two at the Ruby, eight at Hampton and eight at Blowers.

On the whole the canes on the manurial plots germinated fairly regularly and an even stand of canes was, in most instances, obtained at an early date.

EXPERIMENTS WITH SELECTED SEEDLING AND OTHER CANES.

Of this group of experiments, containing 267 plots and having an area of eighteen acres, there are at Henley twenty-four plots of plant canes in 'Todds Line' field and thirty-one plots of first ratoons in 'Long' field; at Coverley twenty-one plots of plant canes in 'Merabah' field, thirty-two first ratoons in 'Old Well' field and twenty-two second ratoons in 'Middle Camminus' field; at Husbands twenty-four plots of plant canes in 'Four Acre' field; at Blackmans thirty plots first ratoons in 'Big Betty' field and twenty-six plots second ratoons in 'Guava Hole' field, and at Waterford twenty-four plots plants canes in 'Burnt' field and thirty-three plots first ratoons in 'Dixon' field.

On the whole a fairly good stand was obtained on all the plant and ratoon plots mentioned above.

EXPERIMENTS WITH SEEDLING CANES (OTHER THAN FIRST YEAR) AND DIFFERENT NAMED VARIETIES.

In this section of the experiments there are 794 plots with an area of about thirty-four and one-third canes. At Dodds there are 366 plots of plant canes in the following fields, viz:— 'Lower Padmore' seventy-six, 'Cat Hole' fifty-eight, 'Pilgrim' forty-one, 'Harrow' thirty, 'Summervale' fifty-two, 'Upper Bay Tree' fifty and 'Upper Nightingale' fifty-nine. In 'Dodds Line' field at Sunbury twenty-four of plant canes; in 'Twelve Acre' field at Hampton sixteen of plant canes, and in 'Street' field fourteen of first ratoons; at the Pine in 'Nine Acre' field eighty-one of plant canes and at Waterford in 'Sandy' field 293 plots of plant canes.

During last reaping season nine plots of certain of the seedling and other canes which had proved to be exceptionally rich in saccharose, were planted in 'Lemon Tree' field and have since been cut up and replanted.

EXPERIMENTS WITH SEEDLING CANES OF THE FIRST YEAR'S GROWTH.

There were in 'Pear Tree' field at Waterford 4,192 seedling canes, the best of which were cut and replanted last December.

We desire again to state that only a certain number of the above plots will be tested. Seedling and other canes which proved unsuitable for further cultivation when reaped last year have not been replanted, consequently the plots containing these canes will not be retested this year.

CHEMICAL SELECTION PLOTS.

Ten plots of these canes taken from the chemical selection canes reaped last March, were with the permission of Mr. H. E. Thorne, replanted at Sandy Lane plantation in a field which could be irrigated. The cuttings were, as before, divided into three groups according to their saccharine richness, and each group was further subdivided into three lots; so that the first plot which is known as 'High-high' are plants from canes containing the sweetest juice from the sweetest group; 'High-middle' containing the medium sweet canes from the sweetest groups and so on down to the ninth plot.

ESTATES LARGE SEEDLING PLOTS.

There are in addition to the plots mentioned above about 130 acres of the seedling cane B. No. 208 growing, in most instances under similar conditions, in the same fields with the White Transparent; and it is hoped that the yield of these or the greater part of them will be obtained during the coming reaping season.

The experiments which end December 1903 or during the reaping season of 1904 are as follows:—

EXPERIMENTS WITH MANURES.

Of the eighty-four small manurial experiment plots of eleven acres, there are twenty-five in 'Jack-in-the-box' field at Hopewell. In addition to these twenty-six acre experiment plots have again this year, with Mr. Cameron's permission, been established on certain of the estates under his charge. Of these eight are in 'John' field at Foursquare; five each in 'Nat Valley' and 'Twelve Acre' fields at Hampton, and four each in 'Burnham' and 'Mill' fields at the Ruby.

The canes on these plots have on the whole germinated regularly and an even stand has been obtained.

EXPERIMENTS WITH SELECTED SEEDLING AND OTHER CANES.

In this section of the experiments there are ninety-eight plots of plant canes covering an area of seven and a quarter acres. Of these there are sixteen in 'Suck Hole' field at Henley, twenty in 'Long Ground' field at Applewhaites, twenty in 'Foaster' field at Waterford and twenty-four in 'Cottage' field at Husbands.

On the whole the canes in this group have started to grow regularly, and provided the dry season does not set in too early a uniform stand will be obtained.

EXPERIMENTS WITH SEEDLING CANES (OTHER THAN FIRST YEAR) AND DIFFERENT NAMED VARIETIES.

In this subdivision of the experiments there are 2,771 with an area of eighteen and a half acres. Of these there are 2,550 plots at Dodds in the following fields, viz:—thirty-eight in 'Lower Chapel,' 602 in 'Well', 516 in 'Mill', 982 in 'Lemon Tree', 412 in 'Pasture' and 10 in 'Porch Door'; at Hampton eighteen in 'Nat Valley' field; at Lower Estate thirteen in 'Simmons Bottom' field; at Sunbury 25 in 'Murray' field; at Hannays 24 in 'Cut Hill' field; at Yorkshire thirteen in 'Old Work' field; at Ridge 25 in 'Middle' field; at Claybury 19 in 'Well' field; at Clifton Hall 18 in 'Cliff' field; at Pine 18 in 'South Nineteen Acre'; at Brighton sixteen in 'Long Pond' field and at Waterford 15 in 'Foaster field.'

The weather in December being favourable for the germination of the canes, the spring in this series of the experiments has on the whole been regular.

YOUNG SEEDLING CANES.

During December 1902, panicles were taken from the best of certain of the seedling and other canes and sown. From these about 4,000 young seedlings have been obtained, and are now being pricked off into pots.

THE SOILS OF DOMINICA. By Francis Watts, B.Sc., F.I.C., F.C.S., Government Analytical and Agricultural Chemist for the Leeward Islands.

This report contains the results of analyses of representative samples of the soils of Dominica, collected for Mr. Watts by the local officers of the Imperial Department of Agriculture.

The mechanical and chemical analyses of soils from twenty localities, grouped under seven districts, are given. The mechanical analyses are more readily understood by the aid of a series of diagrammatic illustrations showing the proportions of the main constituents of each soil.

The report is a valuable contribution to our knowledge of West Indian soils, and should prove of especial value in a country such as Dominica where owing to the greater part of the land never having been tilled, there is no fund of experience to guide intending planters. The information contained in this report may well be the means of preventing costly mistakes in planting crops on lands unsuitable to them.

The report may be obtained from the Agents of the Department, price sixpence.

MONTSERRAT: REPORT ON THE EXPERIMENT STATIONS, 1901-02. By A. J. Jordan, Agricultural Instructor, Montserrat.

The report describes the general progress made at the experiment stations, Montserrat, and the experiment work with economic plants carried on during the past year. The main objects of these stations being the improvement of the agricultural condition of the island, it is gratifying to note that nearly 12,000 economic plants were distributed during the year, in addition to large quantities of sugar-cane and sweet potato cuttings, vegetable seeds, etc. The experiments with cotton are of the greatest interest at the present time. High yields have been obtained, and the results indicate that the climatic and soil conditions in Montserrat are suitable to this crop. The report is on the whole distinctly favourable in character, and indicates that useful work is being done by these stations.

The report may be obtained from the Agents of the Department, price three pence.

For a summary of the report for 1900-01 see *Agricultural News*, Vol. I, p. 157.

JAMAICA: ANNUAL REPORT OF THE BOARD OF AGRICULTURE AND DEPARTMENT OF PUBLIC GARDENS AND PLANTATIONS, 1901-02.

The first annual report of the Board of Agriculture of Jamaica has just been issued. Included in this is the report of the Department of Public Gardens and Plantations for 1901-02. Mr. Sydney Olivier, C.M.G., as Chairman of the Board of Agriculture gives a useful summary of events that have led to the formation of the Board and describes the Agricultural, Experimental and Educational Work already undertaken by it. Mr. Fawcett's report on the Botanical establishments under his charge shows that the distribution of economic plants still continues on a large scale and that valuable assistance has been afforded by him and his officers in promoting agricultural education in the island.

JAMAICA: OBSERVATIONS ON VARIETIES OF SUGAR-CANE DURING 1902. By H. H. Cousins, M.A., F.C.S., Chemist in charge of Sugar-cane experiments.

This forms the third report just issued by the Jamaica Board of Agriculture. It contains an account of the preliminary work in regard to testing about one hundred different varieties of canes at the Hope Experiment Station, at Cannon Hill in St. James, under Mr. Joseph Shore, and Worthy Park under the Hon'ble J. V. Calder. We hope to review this report more fully later.

BARBADOS: METEOROLOGICAL TABLES, 1901. Compiled by J. R. Bovell, F.L.S., F.C.S., Superintendent of the Botanic Station, Barbados.

The report presents in detail the rainfall per month and the number of rainy days in the month at 194 stations throughout the island.

The averages of all the stations are given in the final table. January to May were very dry months with 3·15, 1·06, 1·06, 1·99 and 2·52 inches respectively. The succeeding four months were very wet, the returns being 15·52, 19·50, 12·44, and 16·50 inches respectively. In October the rainfall fell to 6·34, November 4·08, December 7·73. The average rainfall for the island for 1901 was 91·89, some fifty per cent. above the normal.

GLEANINGS.

Mr. Francis Watts has recently been on a visit to Guadeloupe in order to gain some insight into the position of the sugar industry and the working of the Central Factory system in that island.

A vineyard has recently been started in St. Kitt's on sloping ground, at an elevation of a few hundred feet above the sea. The vines were obtained from California, and are at present growing 'at stake.' The owner would be glad of any information respecting the best method of pruning vines in the West Indies.

Three fine specimens of the date palm, received from the Royal Botanic Gardens, Trinidad, have been planted out at the Botanic Station, Tobago. The difficulty in cultivating dates in these regions is that the rainfall is usually too great to allow the fruits to mature. Dates require, for their successful cultivation, a high temperature combined with a dry condition of the atmosphere. On the other hand, the date palm requires a fair amount of water at its roots.

A heavy rainfall was recorded at the Agricultural School, St. Vincent, for the month of January last. This was 7·66 inches as against 4·30 inches in January 1902.

A singular pea with four-winged pods and rather large brown seeds when ripe, was presented at the Local Show at Barbados last year as 'English pea.' This has since been grown at the Botanic Station by Mr J. R. Bovell, and it is probably a species of *Tetragonolobus*. Whether it is a really palatable and wholesome vegetable has yet to be determined.

Through the kindness of Dr. George Perez of Orotava, Teneriffe, seed of the very rare Canary Juniper *(Juniperus Cedrus)*, has lately been received for trial in the West Indies. This species is now almost extinct in the Canary Islands and the Department greatly appreciates the assistance of Dr. Perez in obtaining seed of it.

Mr. Broadway of Grenada has forwarded some delicious fruit known in that island as 'Portugal' oranges. They are rather small but with a thin, smooth rind and highly coloured. If packed in fancy boxes, similar to those in use for Tangerine oranges, the Grenada Portugal oranges should readily command good prices both in Europe and America.

We notice that a fine imported Hereford bull, eight years old and acclimatized, is offered for sale by the manager, Hillsborough estate, Dominica. The price asked, delivered in Roseau, is £33.

The Royal Botanic Gardens, Trinidad, offer strong grafted plants of the following good varieties of mango:—Gordon, Peters, Divine, Peach, Julie, Father Louis, No. 11, Malda, etc. Price $1.00 per plant. Budded plants of various varieties of Florida oranges are also on sale at 30 cents each. The kinds offered include Jaffa, Parson Brown, Navel, Homosassa, Tardiff, St. Michael, King, Sandfords, and Mediterranean. Applications should be made to the Superintendent.

An Agricultural Show has been arranged to be held at Lasoye, Dominica. The Agricultural Society of the island has contributed towards the expenses, and the prizes offered consist mainly of agricultural implements such as axes, cutlasses, cacao knives, etc. given by merchants and others at Roseau.

At the February meeting of the Trinidad Agricultural Society, Mr. J. H. Hart, Superintendent of the Royal Botanic Gardens of the colony, read a paper on 'Pine-apple cultivation in Trinidad.' He recommended for cultivation in the island the two varieties of Ripley (the dark one being the same as the 'Black Antigua') 'Smooth Cayenne' and 'La Brea.'

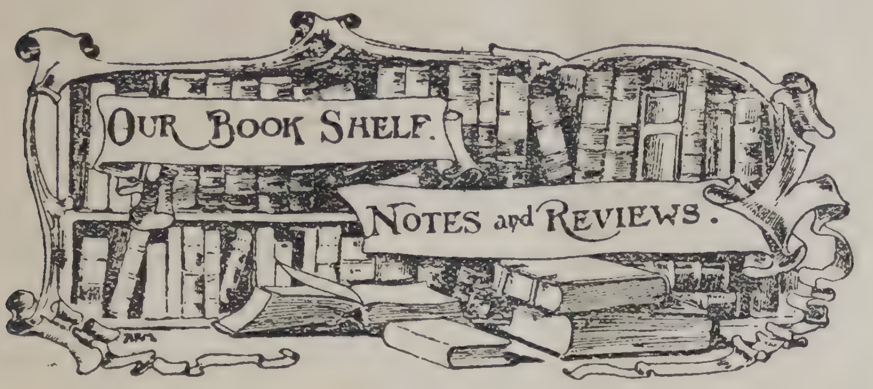
At the same meeting of the above Society it was decided to ask the Government to put in force, over the whole island, the newly passed Ordinance on the Diseases of Plants, in relation to the 'love vine', the local name for species of *Cuscuta* and *Cassytha.*

From seeds obtained from Australia by Sir Alfred Moloney in 1898, a large number of plants of the Cajeput tree *(Melaleuca Leucodendron)* have been established at Grenada. This tree is of especial interest and importance, inasmuch as it thrives on 'salt lands' and in situations where it can only obtain brackish water. A tree is now fruiting in Grenada and it is hoped that seed will soon be available for distribution.

On the shores of many of the West Indian islands is to be found a tree known as the Sea-side Mahoe *(Thespesia populnea)*. It is easily recognized by its hibiscus-like flowers, which, pale yellow in the morning change to a dull reddish colour by the afternoon. The bark is very strong and forms a good substitute for rope amongst the peasantry for tethering goats, sheep, etc. The wood is very light and used for floats to fishing nets.

There are very few sweet oranges grown at St. Kitt's, and supplies are obtained from Dominica and Guadeloupe. During the recent visit of an American Squadron sour oranges from the hills were brought down and sold to the crews. Mr. Belling, the Agricultural and Science Master of the Department at St. Kitt's, writes that he knows of only one seedless orange tree in the island, and of this he has procured buds for propagation.

The West Indian raspberry, redberry or *fraise*, *(Rubus rosaefolius)* is a very familiar plant in Dominica, St. Vincent, and other of the West Indian islands. It thrives best usually at elevations of about 1,000 feet and over. This plant according to the *Annual Report* of the Grenada Botanic Station for 1899, was introduced into Grenada from St. Vincent. It thrives at the Grand Etang, (2,000 ft. elevation), and is of value not only for its fruit, but also as a bee-flower.


Our Book Shelf.
Notes and Reviews.

BULLETIN OF THE DEPARTMENT OF AGRICULTURE, JAMAICA. Edited by Wm. Fawcett, B.Sc., F.L.S., Director, Botanic Gardens, Jamaica.

The *Jamaica Bulletin* hitherto issued by the Botanical Department will in future appear as the 'Bulletin of the Department of Agriculture' and be enlarged to twenty-four pages. The first part of the new volume, to hand, contains useful information in regard to banana soils, kola and manufacture of Panama hats. Lemon juice is said to be used to render the straw white. The 'Ippi-appa' *(Carludovica)*, a native of Jamaica, has lately become of importance for the local manufacture of hats similar to Panama hats.

THE WORLD OF ANIMAL LIFE. Edited by Fred. Smith. *Blackie & Son, Ltd.*

Under the above title, there has been recently published a book on animal life written for the use of schools and young people generally. It contains a good popular account of the most striking and familiar beasts and birds, with a shorter account of reptiles, amphibians, fishes, and the invertebrates. The style is good, the book is likely to be attractive to the young and the illustrations are admirable. The work has the fault of all such books in that far too large a proportion of its space is devoted to mammals and birds. 'Natural Histories' in the popular sense, generally treat of the animal kingdom as being mainly composed of these two groups, which in reality contain but a very small proportion of the whole number of animals and are not of overwhelming importance. Excepting this, the book is excellent and may be confidently recommended. The general 'get-up' of the volume is all that can be desired and has not the rather childish tone that so often mars an otherwise interesting volume.

THE NATURAL HISTORY OF PLANTS.

This excellent work of the late Professor Kerner has already received mention in the *Agricultural News*, and we refer our readers to Volume I, pages 203 and 267 for a general review. Messrs. Blackie & Son are continuing the serial re-issue (to be completed in sixteen parts at 1*s*. 6*d*. each) and we have to acknowledge the receipt of the fifth and sixth parts.

Amongst the subjects dealt with in these two numbers are the ways by which food materials are conveyed from one part of a plant to another, the breathing of plants, seedlings, leaves and stems etc. Amongst the numerous illustrations are some telling clearly the interesting story of the germination of the common mangrove *(Rhizophora)*. As before we confidently recommend this book to all interested in plant life, and also to those not already interested, for Kerner's *Natural History of Plants* is a book to make all, both old and young, desire to know more of the plant world about them.

Nitrogen-gathering Bacteria.

The Secretary of the United States of America Department of Agriculture in his Annual Report for 1902, again draws attention to 'the importance of nitrogen in the nutrition of plants, and to the discovery of a new method of cultivating the bacteria which gather nitrogen in connexion with leguminous crops. This method has been perfected during the past year. The reason for the failure of former work in this line, both in America and Europe, has been determined, and a new, simple, cheap, and thoroughly satisfactory method of growing and distributing the tubercle bacteria for all the important leguminous crops has been perfected. The nitrogen-gathering power of the bacteria grown by our new method is at least five times as great as the nitrogen-gathering power of the ordinary forms found in nature, and the new forms, instead of being restricted to certain legumes, have a much wider range of activity. Field tests on a large scale were started during the year, and advance reports from the co-operating farmers show extremely favourable returns from the use of these organisms.'

Simple Way to Preserve Lime Juice.

A merchant of Basseterre supplies the inhabitants of St. Kitt's and the ships which visit it with raw bottled lime-juice. The juice is obtained in quantity from Montserrat. By the advice of Mr. J. Belling, the Agricultural and Science Master in the island, he has adopted the following means of sterilizing it. The bottles, full but uncorked, are placed in a pan of cold water, which is then boiled for some minutes. The corks, too, float in the water. The bottles are removed from the hot water and immediately corked. In this way they keep without moulding and do not need the addition of any chemical preservative.

Abnormal growth of Corypha elata. Certain palms, among them being the various species of *Corypha*, grow for several years without producing flowers or fruits, they then produce a huge mass of flowers, form their fruits and die. The same thing occurs with other monocarpic plants well known in the West Indies, among them the Agave, where the main plant usually dies after producing its long pole.

Some plants of *Corypha elata* are grown in the Botanic Gardens, Demerara, and Mr. J. F. Waby has recently reported an interesting case of abnormal growth in one of them. In May 1883, three plants of this palm, then some two to three years old, were planted in a group. One flowered, fruited and died in 1901. A second flowered and fruited last year (1902) and is now dropping its ripe fruit, the plant standing gaunt and naked with the panicle of fruits at top. The stem is at least 50 feet high. The third, instead of producing the flowering panicle as the others did, has started into fresh growth and has, as it were, a young plant at the top about the size of one six or seven years old, with no sign whatever of the flowering panicle. This one has retained the large head of foliage usual at the flowering stage. We have had some half-dozen of this Corypha to reach the end of their existence, but this is the first to show anything out of the ordinary course. It would be interesting to know if such a change has been observed anywhere previously.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—February 3, 1903.—Messrs. A. E. De Pass & Co., Messrs. Kearton Piper & Co., 'The Gardeners' Chronicle,' January 31, and 'The Public Ledger,' January 31, 1903.

Aloes—Curaçoa, 14/- to 40/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 3*d*. to $5\frac{3}{4}$*d*. per lb.
Balata—Demerara Sheet, 2/5 to 2/$5\frac{1}{4}$ per ℔.
Bees-wax—£7 10*s*. to £8. per cwt.
Cacao—T'dad, 58/- to 67/- per cwt. ; Jamaica 50/- to 54/- per cwt.; Grenada, 53/- to 58/6 per cwt. ;
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 29/6 to 64/- per cwt.
Cotton—West Indian, $4\frac{7}{8}$*d*. to $5\frac{7}{16}$*d*. per lb.
Fruit—
  Bananas—7/- to 12/- per bunch.
  Oranges—7/- to 12/- per case.
  Pines—2/- to 4/- each.
Fustic—£4 7*s*. 6*d*. to £4. 12*s*. 6*d*. per ton.
Ginger—35/- to 50/- per cwt.
Honey—Jamaica, 20/- to 23/- per cwt.
Kola Nuts—1*d*. to 4*d*. per lb.
Lime Juice—Raw, 9*d*. to 1/- per gallon. Concentrated, £12 5*s*. per pipe.
Logwood—£4 3*s*. 9*d*. to £4 8*s*. 9*d*.
Mace—1/6 to 1/11 per ℔.
Nitrate of Soda—Agricultural, £9 7*s*. 6*d*. per ton.
Nutmegs—70's. @ 1/10, 65's. to 66's. @ 2/3, to 2/6 per ℔.
Pimento—$2\frac{1}{8}$*d*. to $2\frac{7}{16}$*d*. per lb.
Rum—Jamaica, 1/7 to 7/- per proof gallon.
Sugar—Muscovado, 10/6 to 12/6. Crystallized, 13/6 to 15/6 per cwt.
Sulphate of Ammonia—£12 5*s*. to £12 6*s*. 3*d*. per ton.

Halifax, N. S.—'The Maritime Merchant,' January 29, 1903.

Molasses—Barbados, 25c. to 26c. per gallon.
Oranges—Jamaica's, $4.50 to $5.00 per barrel.

New York,—February 6, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, 90c.; eight hands, 70c.
Cacao—African, $12\frac{1}{4}$c. to $12\frac{3}{4}$c. ; Caracas, 14c. to 16c. ; Jamaica, $10\frac{3}{4}$c. to $11\frac{3}{4}$c., ; Grenada, $11\frac{1}{2}$c. to $12\frac{1}{2}$c. ; Trinidad, $12\frac{3}{4}$c. to 14c. per lb.
Cocoa-nuts—Trinidads, $15.00 to $16.00 ; Jamaicas, $18.00 $20.00 per M.
Coffee—Rio, good ordinary $5\frac{3}{8}$c. ; Jamaica, fair to good ordinary $8\frac{1}{2}$c. per lb. ; Manchester grades 8c. to 10c. per lb.
Ginger—$6\frac{1}{2}$c. to 7c. per ℔
Pimento—4c. to $4\frac{5}{8}$c. per lb.
Rubber—Nicaragua scrap, 66c. to 67c. per lb ; Guayaquil strip, 59c. to 61c. per ℔ ; Esmeralda sausage $66\frac{1}{2}$c. per lb.
Sugar—Muscovado, 89°, $3\frac{1}{8}$c. to $3\frac{3}{16}$c. per lb.; Centrifugals, 96°, $3\frac{11}{16}$c.; Molasses, 89°, $2\frac{7}{8}$c. to $2\frac{15}{16}$c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—February 10, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—10c per gallon, package included.
Sugar—$1.40 per 100 ℔.

Barbados,—February 14, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb. Market bare.
Cacao—Dominica, $14.00 per 100 lb.
Coffee—Jamaica and ordinary Rio $8.50 to $9.50 per 100 lb. respectively.
Hay—New Brunswick, 90c per 100 lb.
Manures—Nitrate of Soda $60.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $80.00 ; Sulphate of Potash $67.00 per ton.
Molasses—12c. per gallon, and $4.00 per puncheon.
Onions—Madeira, $4.50 per 100 ℔.
Potatos—$1.57 per 100 lb.
Rice—Ballam, $4.27 per bag (190 ℔.) ; Patna, $3.50 per (100 ℔.); Rangoon, $3.00 per (100 lb.)

British Guiana,—February 11, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8.00 per barrel.
Balata—40c. to 42c. per lb.
Cacao—native 11c. to 12c. per lb.
Cassava Starch—$7.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica, $11\frac{1}{2}$c. to 12c. per lb. (retail.)
  —Creole, 11c. to 12c. per lb.
  —Dhal, $3.90 to $4.00 per bag of 168 ℔.
Eddoes—$1.68 per barrel.
Onions—Retail $3\frac{1}{2}$c. to 4c. ; Garlic 7c. to 8c. per lb.
Pea Nuts—Curaçoa, $3\frac{3}{4}$c. ; American, 5c. per lb. (retail.)
Plantains—24c. to 60c. per bunch.
Potatos English—$2.75 to $3.00 per barrel.
Rice—Ballam, $4.75 ex store ; Patna and Seeta, $5.75 to $5.90 per bag.
  —Creole, 16c. to 18c. per gallon.
Sweet Potatos—Barbados, $1.20 per barrel.
Tannias—$1.68 per bag.
Yams—$2.40 per bag.
Molasses—Vacuum Pan, yellow, 15c. to 16c. per gallon, casks included.
Sugar—Dark Crystals, $1.85 to $1.95 ; Yellow, $2.30 to $2.50 ; Molasses, $1.40 to $1.60 (nominal) per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—Messrs. Edgar Tripp & Co., February 12, and Messrs. Gordon Grant & Co., February 10, 1903.

Balata—No quotations.
Cacao—Ordinary, $12.00 to $12 25 ; Estates, $13.00 per fanega.
Coffee—6c. per lb.
Onions—$3.00 per 100 lb.
Potatos English—$1.30 to $1.50 per 100 lb.
Rice—Yellow, $4.40 to $4.60 ; White Table, $5.25 to $6.00 per bag.

Publications on sale of the Imperial Department of Agriculture

FOR THE WEST INDIES.

The 'WEST INDIAN BULLETIN.' A Quarterly Scientific Journal.

Volume I. Reports of the Agricultural Conference of 1899 and 1900 and other papers; complete, in the original paper covers as issued, post free, 5*s.* The parts can no longer be sold separately.

Volume II. Full report of the Conference of 1901, and other papers. Price, in original paper covers as issued, post free 2*s.* 9*d.*

Volume III. No. I. Agricultural Conference of 1902: President's Address and Sugar Industry. No 2. Conference of 1902 (continued). Educational and General Papers. No. 3. Sugar Industry, Scale Insects, School Gardens, Object Lessons, Volcanic Phenomena, etc. Price 6*d.* Post free 8*d.* each. No. 4. Scale Insects, Sorghum Poisoning, A new Insecticide, etc.

PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied:—

(3) Seedling and other Canes, at Barbados 1900. Price 2d. Post free, 2½*d.*
(5) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d.* Post free, 4½*d.*
(6) Recipes for cooking Sweet Potatos. Price 2*d.* Post free, 2½*d.*
(7) Scale Insects of the Lesser Antilles, Part I. Price 4*d.* Post free, 5*d.*
(8) Cultivation of Vegetables in Barbados. Price 2*d.* Post free, 2½*d.*
(9) Bee-keeping in the West Indies. Price 4*d.* Post free, 5*d.*
(10) Manures and Leguminous Plants at Barbados, 1898-1901. Price 4*d.* Post free, 5*d.*
(11) Hints for School Gardens. Price 2*d.* Post free, 2½*d.*
(12) Seedling and other Canes in the Leeward Islands, 1900-1901. Price 2*d.* Post free, 2½*d.*
(13) Seedling and other Canes at Barbados, in 1901. Price 4*d.* Post free, 5*d.*
(14) Screw worm in Cattle at St. Lucia. Price 2d. Post free, 2½*d.*
(15) Plain Talk to Small Owners Price 2*d.* Post free, 2½*d.*
(16) Hints on Onion Cultivation. Price 2*d.* Post free, 2½*d.*
(17) General Treatment of Fungoid Pests. Price 4*d.* Post free, 5*d.*
(18) Recipes for Cooking West Indian Yams. Price 2*d.* Post free, 2½*d.*
(19) Seedling and other Canes at Barbados, in 1902. Price 4*d.* Post free, 5*d.*
(20) Seedling and other Canes in the Leeward Islands. Price 2*d.* Post free, 2½*d.*
(21) Cotton and Onion Industries in the West Indies. Price 2*d.* Post free, 2½*d.*
(22) Scale Insects of the Lesser Antilles, Part II. Price 4*d.* Post free, 5*d.*

'NATURE TEACHING.'

A text-book based upon the general principles of Agriculture for the use of schools, prepared by the Honourable Fravcis Watts and others. (Pages XII and 199) The Plant, the Soil, Plant food and Manures, Weeds, and Insects are successively treated, and the information given is illustrated throughout by simple experiments which can readily be carried out in an ordinary school. The Book is mainly intended for the use of Teachers. Price, limp cloth 2*s.*, or in a superior style of binding 2*s.* 6*d.* Postage in either binding, 3½*d.* extra.

The 'AGRICULTURAL NEWS' A Fortnightly Review.

The '**Agricultural News**' contains extracts from official correspondence and from progress and other reports; notes on interesting points connected with the work carried on at the Government Laboratories, Botanic Stations, Experiment Stations Agricultural Schools, Experiment Plots, School Plots, Agricultural Shows, Lectures to teachers etc., the occurrence of disease, the arrival of new plants and animals, the flowering and fruiting of plants of special note, the appointment, promotion and removal of officers, the weather, and, in fact, any information indicating what is going on in each Colony and the progress made in Agricultural matters throughout the West Indies.

The '**Agricultural News**' is printed in time to be distributed, regularly, by each mail, and is on sale by the local agents of the Department at one penny per number, post free, 1½*d* The subscription price is 2*s.* 2*d.* per year or including postage 1*s.* 7½*d.* per half-year, or 3*s.* 3*d.* per annum. *All applications for copies are to be addressed to the Agents, not to the Department.*

Agents.

The following have been appointed agents for the sale of the publications of the Department:—

London: Messrs. DULAU & Co., 37, Soho Square, W. *City Agents:* THE WEST INDIA COMMITTEE, Billiter Square Buildings, E.C. *Barbados:* Messrs. BOWEN & SONS, Bridgetown. *Jamaica:* THE EDUCATIONAL SUPPLY COMPANY, 16 King St., Kingston. *British Guiana:* 'Daily Chronicle' Office, Georgetown. *Trinidad:* Messrs. MUNRO & Co., Frederick St., Port-of-Spain. *Tobago:* Mr. C. L. PLAGEMANN, Scarborough. *Grenada:* Messrs. F. MARRAST & Co., 'The Stores,' St. George. *St. Vincent:* Mr. W. C. D. PROUDFOOT, Kingstown. *St. Lucia:* Mr. R. G. McHUGH, Castries. *Dominica:* Messrs. C. F. DUVERNEY & Co., Market St., Roseau. *Montserrat:* Mr. W. LLEWELLYN WALL, Plymouth. *Antigua:* Mr. S. D. MALONE, St. John's. *St. Kitt's:* Messrs. S. L. HORSFORD & Co., Basseterre. *Nevis:* Mr. S. D. MALONE, Charlestown.

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[33.]

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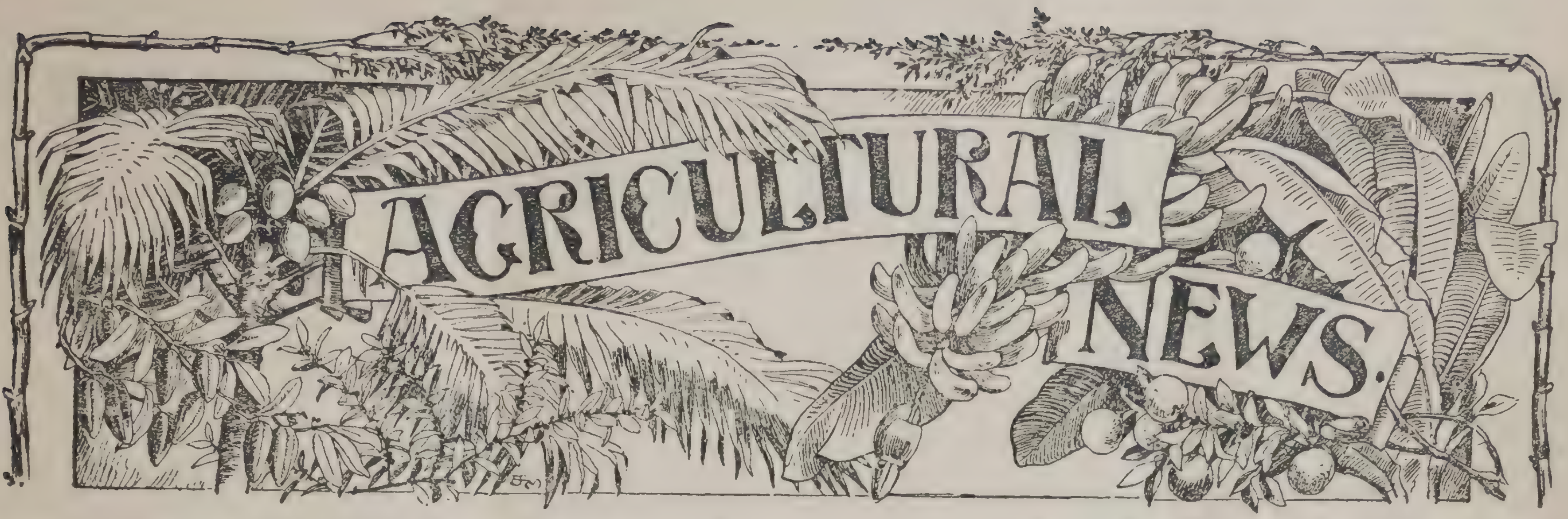

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. II. No. 24. BARBADOS, MARCH 14, 1903. PRICE 1*d.*

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Protection of Birds.

LITTLE observation is needed to convince anyone that birds play a very important part in the general course of nature. They are no doubt responsible for a certain amount of destruction to grain crops and fruit, they consume a large quantity of seeds of plants, they destroy a certain amount of fish in the sea, they form an effective check on the insect life in ponds and streams, and probably most extensive of all, they wage war on the insects found everywhere on or near the surface of the ground and on trees and plants.

From the agriculturist's point of view, the degree of injury inflicted by birds varies according to the locality or nature of the prevailing crops. In the West Indies the total destruction caused to grain and fruit is probably very small. The consumption of plant seeds may be beneficial in checking the spread of weeds or it may be harmful from the distribution of plants whose seeds are not destroyed but carried to another place where they can germinate. The destruction of fish, even by sea birds, is too remote to be noticeable, and the insect life of ponds and streams is not directly important.

The influence of birds, is however, most marked in the destruction of insect life on land. The importance of this can hardly be over-estimated. It is questionable whether any single crop could be grown, at all, if birds were to be exterminated and no other check substituted. Daily we can see the influence of birds in field and garden, and it should be the duty of all connected with agriculture to encourage bird life in every way.

Birds increase but slowly, and there is little likelihood at present of any West Indian bird increasing to a harmful extent. There are certain natural checks on the increase of birds, just as there are on all forms of animal life, but whilst man only occasionally influences the increase of other forms of life, he does so constantly in the case of birds. This is from every point of view a mistake. Birds if not molested, will live on cultivated lands and near houses, becoming tame to a certain degree. Their increase is assisted, and their very useful work in the field and garden is materially augmented if they are looked on and treated as friends and allies. As this fact is little realized by any but the more educated classes of the community 'Wild Birds Protection Ordinances' have been adopted in most colonies, with the view of checking the destructive tendency of the average peasant and small boy. There should be such an ordinance in every colony, and though there are ordinances existing in many parts of the West Indies, they are either not enforced or are not sufficiently comprehensive. Cultivation in some colonies has absorbed a large proportion of the land, rendering life harder for the majority of birds. In others it is yearly spreading, and thus robbing the birds of their wild haunts and natural homes. There is, therefore, the more urgent reason for giving every assistance to birds, for not only is their natural habitat becoming every day smaller, but the area of cultivation on which their services is required to guard crops from insect attacks, has steadily increased.

We are convinced that every colony should have, and should rigidly enforce, a 'Wild Birds Protection Ordinance.' This should be drafted on comprehensive lines, not allowing sporting interests to outweigh the needs of agriculture; and every bird which, either directly or indirectly, assists in insect destruction should be included not only in a close season, but in absolute protection, making its destruction a punishable offence. This should be a part of the permanent policy of all agricultural communities, and we hope that in the West Indies, the force of the public opinion, will be steadily enlisted and directed to this end.

Bitter or Sour Grass of Grenada. Mr. W. E. Broadway, Curator, Botanic Station Grenada, writes that this grass *(Panicum lanatum* - P. leucophæum) is useful in two ways. The peasantry in making their 'coal pits' to prepare charcoal known locally as 'coals,' cover the wood with the grass before placing on soil or coal dust, or both, for the purpose of excluding air. Charcoal is in great demand in Grenada for fuel and sells readily at 2*s*. a barrel. The second use of the plant is as fodder in the dry season, although stock generally refuse it when fodder is plentiful. Attractive, when flowering in quantity, the Grenada bitter grass may be looked upon also as an ornamental plant.

SUGAR INDUSTRY.

Raising Seedling Canes at Antigua.

An effort was made last year to raise seedling canes at Antigua, but with little success, three seedlings only being secured. These have been cultivated and will be ready for reaping and testing during the present month.

The experiments were continued this season, and at a meeting of the Agricultural and Commercial Society of Antigua, held on February 6, Mr. W. N. Sands, Curator of the Botanic Station in the island exhibited a box of seedling canes. These had been raised in soil which had been carefully burnt to destroy any grass, etc., and the boxes were kept covered until the sugar-cane seed was ready to be sown. This year's results appear to be very successful, and we hope that some of the Antigua seedlings may prove to be canes of high merit.

Molasses and Cotton Seed Meal to Stock.

From the experience of those who have become converts to molasses feeding it is found that the best way to make stock eat any quantity of it is to mix it with their other feedstuff, pouring it over what grain is given, their fodder stuffs, or on cotton seed meal if any is fed. It has been stated by scientists that molasses has a nutritive value equal, pound for pound, to that of corn, and such being the case, it seems wasteful extravagance to feed corn or oats at the present high prices when final molasses sells for no more than from four to eight cents per gallon. Of course some vegetable product, abundant in proteids, such as cotton seed meal or a fodder stuff, must be fed to balance the heavy percentage of carbohydrates in molasses, which latter feed is a decidedly one-sided ration. Being a liquid, molasses has the advantage of undergoing digestion quicker than solid foodstuffs, besides being so much cheaper than grain. In feeding molasses, though, care must be exercised with the amounts of the ration if deleterious salts are used in the process of sugar manufacture. From experiments made under Dr. Stubbs' direction, we feel it safe to say that many thousands of dollars annually would be saved our sugar planters if they would take more to feeding cotton seed meal and molasses, with pea vine hay, to their work stock, it having been shown that the meal can safely be fed in limited quantities as a substitute for the balancing properties of the grain. (*Sugar Planters' Journal*, February 7, 1903.)

ST. VINCENT.

Experiments in Volcanic Ash.

In what is known as the Carib country, on the windward coast of St. Vincent, there are several sugar estates that suffered severely from the effects of the recent volcanic eruptions. The principal of these are: Grand Sable, Mount Bentinck, Langley Park, Rabacca, Lot 14, Waterloo, Orange Hill and Tourama. They occupy an extensive district about six miles in length, running parallel to the sea, northward from Georgetown. At the back are the steep slopes of the central chain of mountains, cut up into numerous ravines, culminating in the volcanic peak known as the Soufrière, 4,000 ft. high.

There were three severe eruptions of the St. Vincent Soufrière, viz: on May 6, September 3-4 and October 15-16, 1902. On each occasion enormous quantities of mud, ash and pebbles, and in some instances large bombs were ejected from the volcano destroying life and severely injuring buildings and cultivation on the windward coast, north of Georgetown, and on the leeward coast to the north of Chateaubelair. It is estimated that nearly the whole of the northern third of the island was included within the zone of destruction. It is true that the larger portion of this area consisted of high mountain lands, precipices and ravines, incapable of cultivation: on the other hand, the lower slopes and lowlands formed, possibly, the most fertile districts in the island. In a report lately prepared by the Imperial Commissioner of Agriculture, after a careful examination of the present condition of the Carib country, it is stated that the average thickness of the volcanic deposits on the cultivated portions of the estates above-mentioned, in December last, was about 9 to 10 inches. The May ash, lying immediately on the original surface, was about 6 inches in thickness, and the October ash was from 3 to 4 inches in thickness. In some localities, where driven by wind or carried by water, the deposits were several feet in thickness, but these were in hollows and ravines and not on flat or cultivated land.

With the view of testing the possibility of starting cultivation, with certain plants, on the estates above referred to (provided there are no further eruptions), the following experiments have been started at the Experiment Station at Georgetown by the Curator, Mr. Powell, under the direction of the Commissioner of Agriculture. On January 24 last, the series of experiments in hand was as follows:—

Sugar-cane.—*(a)* Planting two rows of sugar-cane plants in the original soil; *(b)* Planting two rows of sugar-cane plants in the May ash mixed with about 6 to 8 inches of the original soil; *(c)* Planting two rows of sugar-cane plants in the May and October ash mixed thoroughly with the original soil; *(d)* Planting two rows of sugar-cane plants in a mixture of the May and October ash only.

The trenches or 'lanes' are 6 feet apart, the plants in the rows are also 6 feet apart with two plants to each hole. In order to ensure uniformity in the experiments, one row in each section was planted with the variety of cane known as B. 393. The other varieties of cane used were Rockhall, D. 115, B. 147, and the Jamaica cane. A diagram of the order of planting has been prepared and 'plot labels' attached.

Cotton.—Four sections were prepared, as in the case of the sugar-cane, and planted with cotton with two or three seeds in a hole about 18 inches apart in the rows.

Ground-nuts.—Three plots of equal size were laid off and selected 'nuts' planted in *(a)* original soil, *(b)* May ash and original soil mixed thoroughly together, *(c)* May ash and October ash with about 4 to 6 inches of the original soil mixed together.

Arrowroot.—Three plots, similarly treated as in the case of ground-nuts, were planted with arrowroot.

Sweet potato.—Experiments with sweet potatos have, also, been undertaken on the lines above indicated.

In addition to the above, Dr. Morris has suggested experiments with the view of demonstrating that in many instances it may be possible to resume cane cultivation in the Carib country by opening up trenches through the ash so as to reach the original soil. The ash might be piled up on each side of the trenches to form a bank. The original soil with a certain amount of the ash mixed with it might then be broken up and planted with canes. It is believed by these means (provided, again, there are no further eruptions) that cultivation might be gradually resumed over a considerable area in the Carib country. Cotton might do even better than canes, and there would be the advantage in favour of cotton that water and expensive machinery would not be absolutely necessary.

In other parts of St. Vincent, that is, in districts a little to the south of a line drawn across the island from Georgetown to Chateaubelair comprising extensive areas of cultivable lands, beyond the reach of any eruptions that have taken place in historic times, cotton, fruit and food crops might at once be planted with every hope of success. There is, also, a good opening for a comparatively large industry in raising cattle, horses, mules, goats and poultry. These find a ready market at St. Lucia, Trinidad and British Guiana. The Imperial Department of Agriculture has assisted in this direction by grants for the purchase of a pedigree Hereford bull, Berkshire pigs, goats, sheep and improved breeds of poultry.

Animal Phosphorescence. The phosphorescence of the sand-hopper *(Talitrus)* has been proved to be due to a bacterium which is both disease-producing and luminous. It inhabits the abdominal cavity of the animal, permeates all its organs and, finally, causes its death. During the course of this malady the victim shines with a green light, visible nearly a dozen yards off and persisting for a few hours after the death of the animal. Bacteria have also been proved to be the cause of the luminosity of some land animals.

WEST INDIAN PRODUCTS.

Spices etc. in the London Market.

The following interesting notes on nutmegs, mace, ginger, etc., have been contributed to the *Agricultural News* by Mr. J. R. Jackson, A.L.S. For his previous article see pages 52 and 53 of this Volume:—

'In reviewing the London drug and other produce markets for the month of January, it must be noted that the usual business activity which the Christmas season and the New Year always interfere with—followed as they are by stock taking and other cleanings up of the old year—had not been fully restored until the month was well in. At the commencement of a year it is not unusual for the prospects of the trade generally to be discussed. The outlook of special products which may have been affected by political disturbances or bad seasons also frequently receive attention.'

NUTMEGS AND MACE.

Mr. Jackson quoted the important circular of the Amsterdam firm of brokers with reference to the expected short crop of nutmegs in the Bandas in 1903, which has already appeared in the *Agricultural News* (Vol. II, p. 58). Commenting on this he continued:—

In consequence of this report a large business has been done in both nutmegs and mace at advancing prices. In the middle of the month nutmegs were quoted as follows: Singapore 80's, 1*s.* 9*d.* per ℔. Penang being held for 1*s.* 10*d.*, and 110's sold at 1*s.* 1*d.* per ℔., while West Indian 65's, rather wormy, were sold at 1*s.* 10*d.*, and 76's at 1*s.* 6*d.* Mace also fetched higher prices and stood as follows: Good pale heavy West Indian 2*s.* 6*d.* per ℔., fair pale curly 1*s.* 11*d.*, fair red 1*s.* 8*d.*, and broken 1*s.* 4*d.* to 1*s.* 6*d.* per ℔., while fair Penang stood at 2*s* 2*d.* per ℔. A fortnight later prices had again advanced, West Indian nutmegs and mace realizing ½*d.* to 1*d.* per ℔. more.

KOLA, LIME JUICE, OIL OF BAY AND MUSK SEED.

Amongst other West Indian products offered at the earlier sale were 24 packages of fair sound kola which sold at from 3¼*d.* to 3½*d.*, and wormy at 1¾*d.* per ℔. Four barrels of unworked lime juice from Antigua sold at 10*d.* per gallon, and 12 hogshead of concentrated juice realized £11 10*s.* per pipe. At the sale on January 22, concentrated Dominica juice sold at an advance of 5*s.* per pipe; namely, at £11 15*s.*, and genuine West Indian distilled oil of bay from Tobago was limited at 5*s.* 9*d.* per ℔. At the first sale of the year, four packages of musk seed from Trinidad, described as of weak flavour, sold at 1*s.* per ℔., subject to approval. Fine Martinique seed for which 2*s.* per ℔. was asked privately, was reported to be very scarce.

GINGER.

With regard to ginger, the following items which show how the market stood on the twenty-second of the month * may be of interest: Bold native cut Cochin was bought in at 85*s.* and medium and small at 60*s.* per cwt. Jamaica sold at 37*s.* 6*d.* to 38*s.* 6*d.* for ordinary dull. Japan was selling privately at 32*s.*; the new crop from that country is reported to be plentiful and was being offered at 23*s.* per cwt. c.i.f. terms. In connexion with the exports of ginger from Japan, it seems that in 1901 the total quantity to all countries amounted to 1,162,359 kin. against 1,361,715 kin. in 1900 (a kin equals 1·3 lb. avoir.), the values respectively being 130,968 yen, and 134,962 yen (a yen equals 2*s.* 0½*d.*) Of this quantity as much as 655,583 kin were sent to Hong Kong—the largest quantity exported to any one place; the next larger customer was British India taking 272,661 kin, while Great Britain took 16,867 kin of the value of 2,468 yen. Some of the remaining countries to which the Japanese send their ginger are Australia, China, Egypt and the United States. In explanation of these figures it is stated that of the large quantity sent to Hong Kong, the bulk of it was for transhipment to Europe; while British India, which is the largest consumer of Japanese ginger dropped considerably in her imports, which in 1900 were 629,221 kin valued at 62,644 yen. It is curious to account for the reason of such large exports to our Indian possessions seeing that India itself is a large ginger-producing and exporting country. Points such as these command the serious attention and consideration of all those charged with the development of the resources of British possessions.

WEST INDIA CAPERS.

Mr. J. H. Hart, F.L.S., has suggested the use of the flower buds of a West Indian *Capparis* * as a possible substitute for ordinary capers. The latter are obtained from a creeping shrub, native of the Mediterranean region and pickled in vinegar. The West India capers, prepared by Mr. Hart, are obtained from a middling-sized tree fairly common in these islands. They undoubtedly possess the true caper flavour and the suggestion to utilize them is worthy of record. We are, however, of opinion that in competition with the capers of commerce, they would not pay the cost of cultivation.

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* A general discussion of the respective merits of Cochin and Jamaica ginger, with an account of the trade terms will be found on page 25 of this Volume. [Ed. *A. N.*]

* *Capparis cynophallophora*, the Dog Willow or Bay-leaved Capparis of Barbados, Cod root of Jamaica.

CULTIVATION OF LIMES IN THE WEST INDIES.

The lime industry of the West Indies, although comparatively small as compared with sugar and cacao, is yet of considerable importance at Dominica and Montserrat, supplying at the former more than half the total exports of the island.

At Dominica lime juice alone (raw and concentrated) to the value of £32,212, and lime or essential oil to the value of £2,952 were exported during the year 1901-02. These figures do not include the exports of green limes, in which a considerable trade is carried on with the United States of America and Canada.

At Montserrat lime cultivation has formed for many years one of the chief agricultural industries of the Presidency.

In 1898 and 1899 the export of lime juice averaged over £5,000 per annum. Towards the latter end of 1899 the island was devasted by a severe hurricane and the effect of this on the lime industry was seen by the reduction of the export of lime juice in 1900 to less than £400. Energetic efforts are being made to re-establish the industry and in 1901 the exports of lime juice had increased to over £1,100.

At Jamaica, Trinidad and Antigua the cultivation of limes is carried on to a limited extent; the value of lime juice exported from these islands during the year 1900 being £7,496, £396 and £195 respectively. In the other islands the lime tree, although well known and found in nearly every garden, is grown to meet local requirements only.

CITRATE OF LIME.

Reference has already been made in the pages of this journal (Vol. I., p. 99) to the demonstration experiment, conducted at Dominica in May last by the Hon'ble Francis Watts, Analytical and Agricultural Chemist of the Leeward Islands, in the preparation of citrate of lime for export. Full details of the process are given in the *West Indian Bulletin*, Vol. II., pp. 308-18.

The sample then made was sold in London at the current rate for concentrated lime juice, viz: £12 5*s.* 0*d.* per pipe of 108 gallons. The analysis showed 68·90 per cent. of citric acid, or about 4 per cent. above the standard test.

DOMINICA.

From Dominica Mr. Geo. F. Branch, the Agricultural Instructor, writes:—

The yield per acre varies according to the quality of the soil. On good soils 200 barrels of limes per acre are often obtained, while on poor lands the yield sometimes falls as low as 50 barrels per acre. The average yield is, however, about 120 barrels per acre. From a barrel of limes 7 to 8 gallons of juice are obtained. The juice is either shipped raw or in a concentrated form. The latter is boiled down to a density of ten or twelve to one, that is, 10 gallons of raw juice to one of concentrated. It takes on an average 80 barrels of limes to give 1 hogshead (54 gallons) of concentrated juice. The value of raw lime juice in the London market at present is about 10*d.* per gallon, and of concentrated juice about £11 10*s.* per pipe.

The production of 'essential oil of limes' forms an important branch of the industry. The oil is obtained from the rind of the ripe fruit and is exported either as 'hand-pressed or rind oil,' or as 'distilled oil.' In the preparation of the former, the oil is extracted by the 'ecuelle' process before passing the fruit through the mill. Distilled oil is recovered from the juice, after milling, by the ordinary process of distillation.

The yield of 'rind or hand-pressed oil' averages about 3 oz. per barrel of fresh limes, and is worth in London at present prices about 4*s.* per ℔. Distilled oil is produced at the rate of about 2½ gallons for each hogshead of concentrated juice and is worth in London about 1*s.* 9*d.* per ℔.

Perhaps the most encouraging feature in connexion with the lime industry of Dominica is the steadily increasing trade with the United States of America in green limes, and with British North America in pickled limes. The actual position of this trade may be gathered from the following statistics which indicate the exports referred to for the years 1898-1901:—

Year.	United States, Green Limes, (Barrels, cases, etc.)	British North America, Pickled Limes, (Barrels.)
1898	3,534	——
1899	6,743	——
1900	6,633	428
1901	7,412	904

The value of green limes in the United States varies from $5.00 to $10.00 per barrel according to season and the demand, May and June being considered the best months for shipping them in this condition. This branch of the industry, however, is one requiring considerable care and attention. The limes when thoroughly ripe, but not yellow, are carefully hand-picked from the trees and sorted. All undersized and suspicious-looking fruit is rejected. Each lime is wrapped in thin brown paper and packed in barrels or boxes for shipment.

MONTSERRAT.

With regard to the lime industry in Montserrat, Mr. A. J. Jordan supplies the following information:—

The yield of limes in Montserrat, when the trees are in full bearing, is at the rate of about 160 barrels per acre. The yield of juice is calculated at about 8 gallons for each barrel of limes. Concentrated juice is boiled down to a density of seven or eight to one, that is, 7 gallons of raw juice to 1 gallon of concentrated. About 2 oz. of 'ecuelle (rind) oil' are obtained from a barrel of limes, and about 50 oz. of distilled oil from a puncheon of concentrated juice.

Cativo. The product known as Cativo which occasionally apears in the London market and is supposed to be allied to Copaiba in character has recently been proved to be the viscid oleo-resinous juice of a large tree, *Prioria copaifera*, very common in swampy lands in Central America. It may be mentioned that the genus *Prioria* is closely allied to Copaifera from which the commercial balsam of copaiba is obtained—Cativo however presents no similarity to balsam of Copaiba, either in consistency or odour. The taste is faintly bitter but no flavour is perceptible. It is opaque, of a dirty brown colour and resembles birdlime in its viscosity. Concerning the uses of the oleo-resin Mr. E. M. Holmes, F.L.S., writes in the *Pharmaceutical Journal* of September 20 last:—'I have not been able to obtain information but from its consistency it may be presumed it is intended for external rather than internal use.'

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 96 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. II. SATURDAY, MARCH 14, 1903. No. 24.

NOTES AND COMMENTS.

Tree planting by the King.

On February 2, His Majesty the King accompanied by the Prince of Wales and Prince Edward of Wales drove from Windsor Castle to plant three young elm trees in the Home Park at the commencement of an avenue stretching from the foot of the south end of Victoria Bridge to the vicinity of the London and South Western Railway. The implement used by His Majesty and the Princes was a silver ebony-handled spade bearing the following inscription:

> 'This spade was used by His Majesty King Edward VII., his Royal Highness George Prince of Wales, and his Royal Highness Prince Edward of Wales, for planting trees in King Edward the Seventh Avenue, Windsor, February 2.'

The glory of Windsor Park is its magnificent groups and avenues of trees which have been planted and cared for by successive sovereigns, probably, since the time of William the Conqueror.

Desiderata, Botanic Station, Grenada.

The Curator of the Botanic Station, Grenada, would be glad to obtain one or two strong healthy plants each, of the Mangosteen, Durian, Brazil nut, *Ficus religiosa* and *Amherstia nobilis*. An exchange would be made in other valuable plants.

Cotton Planting in Jamaica.

The Jamaica *Daily Telegraph* states that the Agricultural Society in that island has just received from Sir Alfred L. Jones, a gift of 29 tons of cotton seed. At the rate of six pounds of seed per acre this is sufficient to plant over 10,000 acres.

It is also stated that a certain amount of cotton was being planted at the St. Catherine Prison Farm. The Board of Agriculture had decided to apply a portion of the £100 given by the British Cotton Growing Association in purchasing machinery for ginning and baling the cotton and the remainder for premiums to planters for the cultivation of a certain area in cotton during the current.

Fruit Trade Regulations.

At Jamaica a Bill entitled 'The Fruit Trade Regulation Law, 1903,' was introduced on February 14, by the Colonial Secretary. It was announced as not a Government Bill. It provided for the appointment, by the Governor, of a Fruit Trade Committee to frame rules to regulate the packing, inspection and exportation of all Jamaica fruit, and it required that every person engaged in exporting fresh fruit should register his trade mark under the provisions of Law 17 of 1888, and Law 6 of 1889. There was general unanimity in favour of making it compulsory that every shipper of fruit should register his trade mark, but the other provisions of the Bill were regarded as likely to be costly and cumbersome. They were opposed by Mr. W. Watson of the United States Fruit Company, Mr. T. H. Sharp, Mr. H. Cork, the Collector General, and by Mr. W. Fawcett. In the result the motion that the Bill be read a second time was lost without a division. This subject of controlling exported fruit is so important that it is hoped it will continue to receive careful attention in these colonies. We recommend in this connexion a careful perusal of a paper read by Mr. Sydney Olivier, C.M.G., before the West Indian Conference in January 1902. This is published, with the discussion that followed, in the *West India Bulletin*, Vol. III., pp. 131-139.

Surra Disease.

Several references have been made in the *Agricultural News* to the serious character of this disease and the desirability of keeping a watchful eye upon it in order to prevent its introduction, from the United States or elsewhere, into these colonies. In a note published in the *International Sugar Journal* (February, 1903, p. 90) a Mauritius correspondent writes: Very few cases of "Surra" are now reported, very possibly because so little live stock is left alive. In all it is estimated that ten thousand (10,000) head of stock have died since the outbreak in June 1902.' A reprint of an article from the *Archief voor de Java Suikerindustrie*, 1903, Afl. 2 on Surra has recently been issued by the East Java Experiment Station No. 44, 1903.

Pedigree Animals.

As showing the great importance attached to obtaining pedigree animals for improving local breeds, it is stated in the Agricultural Returns for Great Britain for 1901, issued by the Board of Agriculture, that there were exported from the United Kingdom to the United States of America 465 stallions of the total value of £51,287, giving an average value per head of £110. To Argentine during the same period there were exported fifty stallions of the total value of £14,357, giving an average value per head of £287. To Canada there were exported ninety-two stallions of the total value of £9,205 or an average of £100 per head. As regards mares, the United States imported eighty-seven mares of the total value of £17,653 or an average of £203 per head. The total exports of stallions and mares from the United Kingdom to foreign countries and British possessions during 1901 were 5,993 of the total value of £228,077, an average value per head of £176.

The figures relating to cattle, sheep and pigs show that for pedigree animals exported from the United Kingdom to the United States, Argentine, Uruguay, Canada, and other leading agricultural communities, the prices were also very high. It is evident that second or third-rate pedigree animals are not regarded as desirable. In fact they may do positive harm.

◆

Improved breed of Goats.

Information has already been published in the *Agricultural News* (Vol. II., p. 55) respecting the steps taken by the Imperial Department of Agriculture with the view of improving the breed of goats in the West Indies. The goat 'Black Rock' landed at Barbados in December last is now under the care of Mr. Dudley Field and is doing well. The following letter addressed to the Crown Agents for the Colonies by Mr. H. S. H. Pegler, the Secretary of the British Goat Society, affords information in regard to further pure-bred goats that have been obtained for the Department. On the arrival of the animals in the West Indies, arrangements will be made for placing them under such conditions that their services will be fully utilized in these colonies.

Mr. Pegler's letter is as follows:— 'I much regret the delay in replying to yours, but I have been waiting an answer from my correspondent to whom I wrote on receiving your communication. He writes now that he can supply his pure-bred Toffenburg Billy "Bruce" (hornless), born February 18, 1901, Sire, Warwick, Dam, Xgnia, a handsome well-grown goat. He has also a female of the same breed, unrelated, as follows :— 'Pauline' due to kid February 19, aged two and a half years, a first-class milking goat which we strongly recommend.

'I would suggest that Dr. Morris should have this also, and then he could perpetuate a fine stock in the West Indies.'

Brushes from Broom Corn.

At a recent meeting of the Antigua Agricultural Society Mr. W. N. Sands the Secretary and Curator of the Botanic and Experiment Stations in that island read a paper on broom corn and the possibility of preparing brooms and brushes from it, as in the United States. Mr. Sands exhibited specimens of the broom corn grown at the Scott's Hill Experiment Station and also various kinds of brushes, made locally, by Mr. Wellman an expert broom and brush maker. We shall hope, shortly, to publish a summary of Mr. Sands' paper.

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British Honduras.

The *Colonial Guardian* of British Honduras strongly advocates the establishment of what it discribes as a model farm or (as more generally known elsewhere) an Experiment Station at Hope Creek in the Stann Creek District. This is thirty-five miles south of Belize and has a population of about 4,000. Mr. P. C. Cork, the Colonial Secretary, is of opinion that an Experiment Station thirty-five miles inland from Belize would be more generally accessible to the leading agriculturists of the colony. The idea of starting something of the kind has been under consideration in British Honduras for more than twenty years. It is hoped that the newly formed Society of Agriculture and Commerce, with Mr. Cork as its guiding spirit, will, before long, overcome the initial difficulties of the site and that, at least, a beginning will be made in the work described by the *Guardian* of transforming 'the labouring classes of the colony from bushmen to settled cultivators.' The chief industry, hitherto, has been wood cutting. There are several small sugar plantations and numerous areas planted with cacao, and bananas. The real agricultural development of the colony, which is about the size of Wales, has hardly yet begun.

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City Agency for Publications.

The following paragraph appears in Circular No. 90 of the West India Committee, dated February 16, 1903 :—

With a view to furthering the admirable work being done by the Imperial Department of Agriculture, we recently offered to receive for sale or distribution its publications. This offer has been cordially accepted by Dr. D. Morris, who in a letter, dated January 17, expressed his deep appreciation of the offer made by the Committee to assist in the work of the Department. The Secretary of the West India Committee will accordingly be pleased to forward to Members, or others interested, copies of the undermentioned publications of the Imperial Department of Agriculture upon receipt of a remittance for their cost and postage :— The *Agricultural News* (one penny per copy), the *West Indian Bulletin* (sixpence per copy). Pamphlet series (twopence to fourpence per copy).

A full list of the publications of the Department appears on page 96.

INSECT NOTES.

Cacao Thrips.

The following extract is taken from the *Government Gazette* of Grenada, for December, 31 last:—

It is recommended when thrips become prevalent that immediate steps be taken to keep the pest in check by systematic spraying with rosin wash. Fumigation by fire of green wood should be continued at the same time and the effect carefully watched. The latter method has much to recommend it on account of its simplicity and the ease with which it may be carried out by an ordinary labourer. The fires should be set in a careful manner. In making up fires of this nature it should be borne in mind that it is necessary to allow the fire to smoulder only and give off as much smoke as possible. On no account should flames be given off, otherwise the cacao trees might be scorched and injured. Locally, sulphur has been tried as an aid in checking the ravages of thrips. If applied it is necessary to remember that such application must be carried out with caution, sulphurous acid gas being destructive to vegetation.

While spraying is being done an intelligent pruner should go in advance of the sprayers and cut out any unnecessary wood and leaves that would be likely to prevent the wash getting on to the uppermost leaves. The branches and leaves could be afterwards heaped and burnt.

Spraying is best done by the 'Fruitall Sprayer,' a specimen of which can be seen at work at the Botanic Station. Particulars as to the cost of the large sprayers, as also in respect of the formula for making the rosin wash may be obtained on application to the Curator of the Botanic Station or from the Travelling Agricultural Instructor.

For fuller information as to thrips and its treatment, reference might be made to the *West Indian Bulletin*, Vol. II, pp. 175 and 288.

How to get rid of Ticks on Cattle.

The following is taken from a report of the proceedings of the Jamaica Agricultural Society held on February 21 last:—

The Hon. Oscar Marescaux gave an interesting account of the method successfully adopted by him to get rid of ticks on cattle. 'I am pleased,' he said, 'to see that the Agricultural Society are seeking information as to the possibility of destroying the plague of ticks which renders our island a pest to ourselves, to our friends and visitors, and especially to our animals; and as I have succeeded in ridding my property of the pest, you may like to know how this has been done.

'Cherry Garden in St. Andrew consists of nearly one thousand acres of land—gentle slopes,—mountain sides—some cultivation, but principally grass lands. I have cattle and horses, from 80 to a hundred of the former and 8 to 10 of the latter. You can or any lady can walk over any part of the property—short bite, Guinea grass, gullies, ruinate—without picking up a tick, and my stock are free from them, though occasionally a weak cow may be seen with a few which are at once destroyed.

'Some years ago ticks were a plague on Cherry Gardens and I determined to get rid of them. My cattle were constantly driven in the pen and there the cattle men and boys were made to pull off the ticks, placed them in a calabash and when nearly full to burn them in a fire kindled in the pen for the purpose. It was a tedious job to get my people to do this. They all believed it was useless work for the ticks came out of the ground. For a long time little impression was made on the appearance of the cattle, but little by little the ticks were less and less numerous and now, as I have said before, the place is practically free from them.

'I was informed that the tick will not reproduce unless he has sucked blood. I, therefore, aimed at burning all those who had thus feasted. The tick does not travel—the fertilized female drops from her prey, and has her young, commonly known as grass lice. When she drops, these grass lice climb up a grass stalk and cluster up at the top like bees. If a living creature in passing brushes close to them, they soon scramble over it, and endeavour to feed on it; but if nothing disturbs them they simply die.

'The process I have adopted is tedious, especially on account of the passive resistance of the people one employs; but it is efficacious, and I hope you may induce others to adopt it.'

Mr. Fawcett stated that his experience was, in districts where Indian cattle were bred, the ticks were less. Ticks did not attack Indian cattle when they were in good condition, as much as other breeds of cattle.

Dr. Pringle said he had adopted a similar method to that followed by Mr. Marescaux and with success. Ticks were now very much less on his properties than they were two years ago. It was a very good plan.

Mr. Fursden said that the plan was good, and if followed up would diminish the tick plague. But how were they going to compel everbody to follow the plan and do likewise?

Mr. Olivier said the only thing they could do was to make the method of destroying the ticks as widely known as possible. No legislation was needed. Anybody, whose cattle had ticks should simply pick them off and destroy them. He moved that Mr. Marescaux's letter he printed in the *Journal* along with the opinions of the members.

This was agreed to.

Candle Trees. Mrs. Jordan of Walmer Lodge, Barbados, who is a keen observer of plants, recently contributed to the Department specimens of the fruits of the candle tree of Central America. These were obtained from a garden in Belleville. The tree belongs to the Calabash family and the fruits instead of being spherical are very long and narrow and hang like clusters of candles from the stem, hence the botanical name, *Parmentiera cerifera*. The Spanish name is *Palo de Velas*, also in allusion to the candle-like appearance. The peculiar fruits, when ripe, have an apple-like smell and cattle are fattened upon them. Another candle tree with shorter and somewhat fluted fruits *(Parmentiera edulis)* is growing in the Botanic Gardens at Grenada. The fruits of the latter are said to be eaten by the Mexicans under the name of *Cuajilote*.

IMPROVEMENT OF STOCK AT NEVIS.

During the last three years considerable effort has been made by the Imperial Department of Agriculture to assist in the breeding of mules, cattle and small stock in the island of Nevis. This contains 32,000 acres and a population of 13,087, or 262 to the square mile. The sugar industry is in a depressed condition. There are a large number of peasant proprietors residing in the island many of whom are hardworking and enterprising people who deserve encouragement. These have, until lately, grown canes on their own lands and the juice was made into sugar on the neighbouring estates. The recent fall in prices has seriously affected these people and it is necessary for them to give attention to other industries. Possibly, later on, the cultivation of cotton might be successfully taken up by them.

In regard to stock, the following pedigree animals, introduced by the Imperial Department of Agriculture, are now in the island and available, alike, to large and small landowners:—

A half-bred donkey stallion, 'Bismarck,' from Jamaica in charge of Mr. William Maynard, Cane Garden Estate. Two Berkshire boar pigs from Nova Scotia in charge of Mr. Joseph Croney, Hard Times Estate, and Mr. Charles Esdaile, Farm Estate. Two Shropshire rams from Jamaica, one pure-bred, one half-bred, in charge of Mr. Joseph Croney, Hard Times Estate, and Mr. Charles Esdaile, Farm Estate. These were introduced in 1901-'02. All are doing well.

Recently the following were added: One pure-bred Hereford bull, from Nova Scotia, placed in charge of Mr. P. Mills, Pinney's Estate. One trio Black Minorca, one trio Plymouth Rock fowls in charge of Mr. J. Evelyn, Maddens Estate. One trio Brown Leghorn fowls in charge of Mr. J. Inniss, Colthurst's Estate, and one trio Buff Orpingtons in charge of Mr. Charles Esdaile, Farm Estate. The total cost of these animals, delivered in Nevis, was about £150.

ROSES.

Mr. James J. Law, who is a successful rose-grower at Ambleside, Barbados, has been good enough, at the request of the Department, to prepare a list of about thirty of the best roses for cultivation in the neighbourhood of Bridgetown. We should be glad to publish similar lists for other parts of the West Indies:—

Pink Roses: The Revd. J. B. M. Camm, Summer Morn, Catherine Mermet, Baroness Rothschild, Duchess of Albany, Bridesmaid.

Red or Crimson Roses: Earl of Dufferin, Adelaide Coté, Countess of Oxford, Countess of Pembroke, Pierre Guillott, Michael Saunders.

Yellow Roses: Marechal Niel, Perle des Jardins, Medea, Princess Beatrice.

Rose with a salmon-coloured centre: Belle Lyonaise.

White and Carmine Rose: Madame de Watteville.

White Roses: White Malmaison, Elise Fugier, Madame Bellenden Kerr, Niphetos, Coquette des Blanches.

Buff-coloured Rose: Beauty of Europe.

Flesh-coloured Rose: Viscountess Folkestone.

Other good Roses are Kaiserin Augusta Victoria, Merveille de Lyon, Jean Pernet.

HINTS FOR THE WEST INDIES.

The following interesting letter dated December 22, 1902, addressed to the Hon. F. M. Alleyne, M.A., of Barbados, by Mr. F. W. Burbidge, M.A., Curator of the Botanic Gardens of Trinity College, Dublin, contains many points worthy of attention. Mr. Burbidge is well known as a traveller and an author and has a wide knowledge of tropical subjects:—

SWEET POTATOS AND YAMS.

Having read your letter to the newspapers rê sweet potatos and yams, I have written to Messrs. Pink & Sons, of Portsmouth, as to prices, etc. for same.

My object in writing direct to you, may be in fact a 'keen perception of the obvious,' but have these tubers as yet been utilized in the West Indies for the preparation of neutral spirits or alcohol in the way beet-root, potatos, etc. are utilized in Germany, and elsewhere on the continent?

Again could not sugar-cane alcohol be made to take some other form than rum? I mean something more like whisky, the spirit most popular now amongst the middle classes in Great Britain and Ireland, and rapidly spreading elsewhere.

I know Dr. Morris, C.M.G., very well, and feel, sure he and yourself and others must have touched bed rock, in your endeavours to make West Indian produce popular, and remunerative, but suggestions can do no harm.

PERFUMES, ETC.

Could not perfumes be prepared in the West Indies other than 'Bay oil' which itself is not half well enough known in Europe and probably might be 'boomed' with advantage?

What of 'frangipani,' orange flower water, lime juice, by which I mean the juice of the true *Citrus medica*, var. *acida* or lime fruit and not of the common lemon. We can get plenty of lemons imported for squeezing here, but very rarely do we get the delicious little limes.

Every novel introduction or product must nowadays be 'boomed,' or advertised largely, to make it 'go,' and I hope your letter will popularize yams and sweet potatos, both old friends of mine in the eastern tropics

ARROWROOT.

EXPERIMENTS AT MONTSERRAT.

Two plots of 'first ratoon' arrowroot were recently dug at the Grove Experiment Station with the following results:

Local variety (area $\frac{3}{20}$ of an acre) gave a yield at the rate of 9·58 tons of rhizomes per acre.

The yield of the Bermuda variety (area $\frac{1}{40}$ of an acre) was equivalent to 8·85 tons per acre of rhizomes. The first crop reaped from these plots in February last year gave an estimated yield of 13·32 tons from the local variety, and 11·22 tons from the Bermuda variety.

Two plots of 'plants' grown by the side of the 'ratoon' plots gave the following results:—

Local variety (area $\frac{1}{20}$ of an acre) gave a yield at the rate of 11·22 tons per acre, Bermuda variety (area $\frac{1}{20}$ of an acre) was equivalent to 8·92 tons per acre.

The cost of cultivation of $\frac{1}{10}$ of an acre (preparation of land, manure, planting, weeding, and reaping) was 15*s.* The plots were mulched with pen manure at the rate of 15 tons per acre. The soil is light gravelly, and about 8 inches deep. The weather experienced in August and September checked the growth of the plants and caused them to ripen prematurely.

EDUCATIONAL.

Leeward Islands.

FURTHER COURSES OF LECTURES TO TEACHERS.

The following formed an enclosure to a letter addressed by the Commissioner of Agriculture to his Excellency the Governor of the Leeward Islands, dated December 9, 1902:—

These lectures are intended to assist the teachers now in charge of schools, in the manner and method of teaching the principles of agriculture, and in illustrating object and other lessons by specimens or by simple experiments suited to the capacity of the children. Also in indicating how the requirements of the code in force may be satisfied in respect of the teaching of agriculture as a class subject.

The lectures, according to local circumstances, might take the form of addresses delivered at meetings of Teachers' Associations; or more generally, of a set of lectures given at certain centres on Saturdays or other days announced beforehand.

It is desirable that these lectures, when possible, be supplemented, from time to time, by criticism lessons given in the presence of the other teachers to a class so as to exemplify the methods of treating the subject. At these criticism lessons the lecturer, the Inspector or Sub-Inspector of Schools and others interested might be present to advise and assist in the effort now being made to raise the character and standard of the teaching in the elementary schools of the colony.

The Imperial Department of Agriculture will support the scheme by arranging, free of cost, for the lecturers in each case. Also by contributing specimens and affording means of interesting the teachers by visits to the Botanic Stations and other Institutions under its charge.

The following suggestions have been discussed and agreed upon between the Commissioner of Agriculture and the Inspector of Schools and are proposed to be circulated for the guidance and information of those concerned:—

VIRGIN ISLANDS.

There are usually four teachers in this Presidency. At present there are only three. The Agricultural Instructor (Mr. Fishlock) might assist the teachers by going through a course of instruction with them based on Watts' *Nature Teaching*, with special reference to the use of specimens and experiments to illustrate lessons in school. To start the course the Inspector of Schools will communicate with the teachers through the Commissioner of the Virgin Islands. Mr. Fishlock will be informed of what is finally settled by the Commissioner.

ST. KITT'S-NEVIS.

The number of teachers at St. Kitt's is twenty-six, and at Nevis twelve. Mr. John Belling, B.Sc., the Science and Agricultural Master at the Grammar School will undertake the lectures in this Presidency and, possibly, Mr. W. H. Mitchell, M.A., the Head Master of the Grammar School, will be so good as to occasionally preside at the lectures and criticism lessons. Mr. Belling will also interest the teachers in the work carried on by him at the Grammar School and accompany the teachers on excursions and visits to the Botanic Station. The Inspector of Schools will, in the first instance, communicate with the managers and teachers of schools in St. Kitt's and Nevis, and he will afterwards inform Mr. Mitchell as to the arrangements and the date when the courses could begin. The teachers in Nevis may be invited to attend at St. Kitt's. Later it is hoped it may be possible to make other arrangements to meet their requirements.

ANTIGUA.

There are twenty-four teachers in this Presidency. Most, if not all, could meet in St. John's. As in the other islands the first action will be taken by the Inspector of Schools, who will communicate with the managers and teachers and afterwards inform Mr. Watts of the arrangements made and the date when the lectures might begin. When the Science and Agricultural Master to be attached to the Antigua Grammar School has arrived, Mr. Watts will invite his co-operation in carrying out the lectures at Antigua; and Mr. Sands will assist in excursions and visits to the Botanic Station, etc.

MONTSERRAT.

There are twelve teachers in Montserrat. Failing other means of arranging for a lecturer, the Agricultural Instructor (Mr. Jordan), might be prepared to give a course of demonstrations to the teachers on plant life illustrated by specimens and simple experiments. As in the Virgin Islands, Watts' *Nature Teaching* might be adopted and closely followed as a text-book for the whole course. The Inspector of Schools will comminicate with the managers and teachers and afterwards will arrange with the Commissioner (Mr. Watkins), as to the best means of utilizing Mr. Jordan's services.

DOMINICA.

The Inspector of Schools will arrange with the Sub-Inspector in this Presidency in respect both as to the course of lectures and criticism lessons. As the distances are considerable, advantage might be taken of occasions when the teachers are already coming into Roseau and the lectures fixed accordingly. Mr. Tannock, the officer in charge, will give the course of lectures at the Agricultural School following the syllabus adopted in the case of that Institution. The criticism lessons might be given in Roseau preferably in the presence of the Sub-Inspector of Schools.

Barbados.

LECTURES TO TEACHERS.

The following are the dates of the forthcoming Lectures to Teachers in charge of elementary schools, to the end of the present course, arranged by the Imperial Department of Agriculture:—

March 21	...	...	Harrison College.
April 4	...	...	Speightstown.
April 18	...	...	St. Philip.
May 2	...	...	Clifton Hill.
May 16	...	...	Harrison College.
May 30	...	...	Speightstown.
June 13	...	...	St. Philip.
June 27	...	...	Clifton Hill.

Grenada.

AGRICULTURAL EDUCATION.

The following letter dated February 20, 1903, has been received by the Commissioner of Agriculture for the West Indies from the Secretary of the Board of Education at Grenada:—

I am directed by the Board of Education to inform you that, as a result of a reference to the Book Committee of that Body, the schedule of Object Lessons and Nature Teaching in use for the premium examinations, 1903, at Barbados, forwarded to you through the Inspector of Schools in July last, has been adopted for the Annual Examinations here.

With regard to the prizes offered in connexion with the Local Exhibition at Barbados on January 13, 1903, by the Imperial Department of Agriculture, the Board decided that when they consider Agricultural teaching has been established on a sufficiently sound basis, an appeal should be made to you to hold out similar encouragement and inducements to the pupils of the Primary Schools, in connexion with the Grenada Local Industrial Exhibitions.

The Board desires me to express its appreciation of your kindness, and to assure you of its hearty co-operation in all matters connected with the furthering of Agricultural Education.

The schedule of Object Lessons and Nature Teaching in use for the premium examinations in Elementary Schools at Barbados, referred to in the above letter, was published in the *Agricultural News*, Vol. I, p. 107.

British Guiana.

TEACHING OF AGRICULTURAL SCIENCE.

In connexion with the general revised scheme of primary education, the Board of Agriculture, at the request of the Government, has submitted certain recommendations put forward by a Committee, comprising the members of the Agricultural Committee of the Board, along with his Lordship Bishop Galton and Mr. H. W. Sconce, acting Inspector of Schools, as to the requirements of the examinations which it is proposed that pupil-teachers should pass in agricultural science. This recommendation is printed in continuation of the report of the Education Commission, and was laid at the opening of the annual session of the Combined Court. For admission as pupil-teachers, the Committee recommended that the requirement of the examinations be in Blackie's *Tropical Reader*, Books I & II, and *Nature Teaching* by Watts on the seed, root, stem, and leaf. At the end of the first year, the examination is to be based on the same books, and at the end of the second year a standard of increased proficiency is required in *Nature Teaching*. At the end of the third year, the examination will be in parts 1 and 2 of the Teachers' Course (Messrs. Kaufmann and Waby's lectures). The examinations of the third and fourth years, the Committee thought, most largely depend on whether the recommendation of the Education Commission about Queen's College be adopted, and as a *sine quâ non* they suggested that pupil-teachers, during the last two years should be made to go through a course of practical instruction at the Botanic Gardens or Onderneeming School, and in place of examination, reports from the Instructors should be received. The Committee were also of opinion that the preparation of an elementary text-book, dealing with the care of stock in the colony, was desirable for use in the second year, and that a special edition of *Nature Teaching* should be drawn up with reference to British Guiana, for use in the third year. (Demerara *Argosy*, February 28).

Laboratories and Teaching. 'Laboratories are of many sorts, from those built especially for the purpose by some of the greater universities down to the unaltered schoolroom; but *all have this in common: that the room and its furniture are of far less account than the person who directs them.* In other words, it is more profitable to give a good teacher to a poor laboratory than a good laboratory to a poor teacher. Laboratories, like methods, are fine tools for skilled workmen, and they give but indifferent results in the hands of those untrained in their use. Proper laboratories every teacher should strive for; but he is not to suppose that good work must be put off until he achieves them.' (W. F. Ganong in *The Teaching Botanist.)*

Cotton in Barbados.

At the special meeting of the Barbados Agricultural Society, on February 6, (see *Agricultural News*, Vol. II., p. 54) an influential committee was appointed to co-operate with the Imperial Department of Agriculture, in its endeavour to establish the cotton and onion industries in the colony. The members of the committee were:— Hon'ble F. J. Clarke, M.C.P., Speaker of the House of Assembly (Chairman), Hon'ble Forster M. Alleyne, M.A., M.L.C., H. E. Thorne Esq., M.C.P., A. Cameron Esq., G. Sebert Evelyn Esq.

The meetings of the committee were attended by the Commissioner of Agriculture, and Mr. J. R. Bovell, Superintendent of the Botanic Station, Barbados, and on February 28, the following report was presented to the Agricultural Society:—

The Committee, appointed by the Society on February 6 last, to co-operate with the Imperial Department of Agriculture in the endeavour to establish the cotton and onion indurtries in Barbados, have the honour to report as follows:—

In regard to cotton it is evident that considerable interest is being taken in the revival of the cultivation of this industry in the island, and there is every probability that a large area will be placed under cultivation during the next planting season.

It is the opinion of your committee, after consulting with the Imperial Department of Agriculture, that it would be of great advantage to the planting community if the Legislature were approached with the view of providing a sum not exceeding £250 to provide an oil engine, a ginning machine and a baling press, so that the crop produced may be dealt with in an expeditious and successful manner, and that the cotton shipped from Barbados might reach its market in such condition as to test thoroughly its value as compared with cotton grown in other countries.

Also that his Excellency the Governor be desired to communicate with the British Cotton Growing Association and to invite the assistance of the Association on similar lines to that so generously accorded by it to Jamaica.

In regard to the cultivation of onions a supplementary report will be submitted to the Society later.

The Bell Apple. This plant *(Passiflora laurifolia)* is commonly grown in many West Indian Islands. In Trinidad it requires to be cultivated well in the open and on trellisses so that it may get plenty of sun. The fruit is known as the 'Bell Apple.' It is some 2½ to 3 inches in diameter and almost globular, turning from green to a bright yellow on ripening. The outer skin is spongy and leathery, and the contained pulp is, in flavour and consistency, very much like the interior of a large sweet gooseberry, which it surpasses in flavour. It is eaten by paring away a part of the apex, then squeezing the fruit, or by cutting in halves and using a spoon. Care should be taken not to eat any portion of the rind of the fruit, as most of the Passifloras possess an emetic principle, which is slightly developed in the fruit skin of this species, and children are sometimes made ill from this cause. It is an excellent fruit and well worthy a place at dessert. It is commonly sold in the markets of the Windward Islands. *(Trinidad Bulletin.)*

GLEANINGS.

The St. Lucia Agricultural Show is arranged to take place at the Agricultural School, Union, on Friday, March 27.

A planter in Dominica reports that the use of kerosene emulsion as recommended by the Department has produced excellent results in the treatment of cattle attacked by ticks and skin diseases.

'A small biting fly resembling a house fly' is reported to be troublesome at Dominica. This it is hoped is not the fly that causes 'screw worm' in cattle at St. Lucia and elsewhere. It would be desirable in any case for all wounds and sores to be treated with carbolic acid and oil, or with tar as advised in Pamphlet No. 14 of the Department Series.

One of the best canes from the British West Indies imported into Cuba is the 'Caledonian Queen'. The common canes grown in that island are the 'Crystallina' and the 'Yellow Crystalline' variety. It would be useful to identify these canes and find out under what names we have them already in these islands.

An interesting article on 'New Jamaica' drawing attention to the numerous industries now being energetically pushed in that island appeared in the *Morning Post* for February 3. It is observed that the Americans have hitherto been first in the field with regard to the development of the fruit industry, but there are signs that several British firms are following suit, 'and in this connexion it is not unlikely a new era is beginning in the relations of the Queen of the Antilles with the Mother Country.'

A French translation of Mr. W. G. Freeman's paper on the 'Aloe Industry of Barbados,' read before the West Indian Agricultural Conference of 1902, is appearing in the *Revue des Cultures Coloniales.*

Four plants of the 'double cocoa-nut' or *coco-de-mer* of the Seychelles *(Ladoicea sechellarum)* are now established at the Royal Botanic Gardens, Trinidad. They were raised from twelve seeds obtained in 1895.

In reference to the introduction of the mungoose into the island of Carriacou, a Dependency of Grenada, the Hon'ble Edward Drayton, C.M.G., states that the penalty provided by law against such introduction is £20.

Seeds of an excellent pink-fleshed shaddock, obtained from 'Bulkley' estate, Barbados, have lately been distributed to the Northern Islands. In this instance it is hoped the plants will come true from seed.

The weather recently at Grenada has been very favourable to vegetation. At the end of February refreshing occasional showers were falling, helping on young corn, peas, etc.

Mr. M. McNeill, the Agricultural Instructor at Grenada, went to Carriacou on February 18 last, at the suggestion of the Imperial Commissioner of Agriculture, to collect information concerning cotton so as to be in a position to report in detail on the cotton industry of that island for the forthcoming publications of the Department on cotton cultivation.

Mr. Nurse, the second Agricultural Instructor of Trinidad, was due to arrive in Grenada on March 3. This officer has been deputed to visit Grenada so that he may become conversant with the successful work carried on by Mr. McNeill, the Agricultural Instructor, in that colony.

A beautiful little bamboo-like grass is met with occasionally on banks along the highways of Grenada, also on estate roads, etc. It also grows on the La Pastora Estate, St. David's, (Hon'ble W. S. Commissiong, K.C.), where it is known by the name of kalma. From the same source we were informed that boys make whistles from the stems. It makes a charming pot plant. Botanically the grass is known as *Panicum divaricatum.*

Mr. Powell reports that a good deal of interest is being awakened at St. Vincent in bee-keeping. A demonstration took place on February 3, at the Agricultural School, on the use of Cowan's honey extractor, when 16½ ℔. of honey were obtained from a colony kept at the school. On February 21, a further supply of 16 ℔. was obtained from the same colony. Mr. W. C. Proudfoot, Mr. Osment, Mr. T. C. DePasse and others, are mentioned as successful bee-keepers in and around Kingstown.

There is a red bug said to be destructive to cotton at St. Vincent and neighbouring islands. This insect and the injury caused by it are being investigated by the officers of the Entomological Division of the United States Department of Agriculture. It is hoped that practical means will be suggested for dealing with it.

Considerable success has attended the growing of tomatos at the Agricultural School at St. Vincent. Many of the fruits average over 1 ℔. each. The variety grown is 'Ponderosa' from seed supplied by Messrs. Peter Henderson and Co., of New York.

Tomatos of good size and excellent quality are also grown at 'Spencer's' estate in Barbados, by Mr. A. A. Evelyn. Some fine specimens, smooth and round, recently exhibited at a meeting of the Agricultural Society weighed fully 1℔. each.

The pomegranate is not usually cultivated as an ornamental plant in the West Indies. There are, however, double-flowered forms of this plant, one bearing scarlet, the other white flowers. Both are strikingly handsome plants when in bloom. The scarlet form is often seen in gardens at Barbados, where it is known as the 'pomegranate rose.'

PLANT SANITATION.

In the *Contemporary Review* for May 1902, Mr. J. B. Carruthers, Mycologist to the Government of Ceylon, has an article on this subject, from which the following points are taken:—

Mr. Carruthers draws attention to the way in which the vine industry of France, Italy, Germany, etc., was saved from the ravages of the phylloxera by the application of methods suggested by the scientific study of the disease.

In America, £600,000 are spent per annum to maintain a large staff of experts whose efforts are directed to the improvement of agricultural methods, crops and stock, the introduction of new plants, and the prevention and care of epidemic disease.

The author points out that one of the chief difficulties of the plant doctor is the half-hearted carrying out of preventive measures, or the refusal to do anything at all to interfere with the progress of a disease.

Plant diseases are on the increase owing to the multiplication of large areas of plants of the same kind. This danger must be met by corresponding precautionary methods.

All efficient measures for the preservation of health rest upon exact knowledge of the causes of disease and the effects they produce in their victims. During the last fifteen years, the discoveries made in combating insects and fungi which are parasitic on plants have made almost a revolution in agriculture.

The general laws of sanitation in plants do not differ widely from those laid down for preventive medicine in men or animals. They include the removal and destruction by burning of dead plants, or dead parts of plants, suffering from communicable diseases as soon as the attack is noted and before it has widely spread; the prevention of conditions which favour infection; the isolation, by means of trenches, of plants whose roots are diseased; and the exclusion and quarantining of plants from infected countries. These are, however, almost useless without an intelligent watching for the appearance of disease. It is not unusual to find that there is so little observation, that the crop is markedly devastated before the disease is noticed. It is necessary, when sanitary laws are announced, that they should receive the support of those they are intended to benefit, and a belief in such rules must be inculcated in those engaged in cultivating plants.

The Hatstand Tree. This name is given to a tree (*Rheedia lateriflora*) common in the woods of Trinidad, noted for its regularly branching character when small. It is often cut and placed in a heavy base as a hatstand. A small tree of eight or ten feet will often have as many as twenty or more branches of even size thrown out at regular and close intervals at about an angle of 45 degrees from the main stem. These when shortened down into a pyramid form, and nicely trimmed and polished, serve exceedingly well for the purpose. If the main stem is further provided with rings about 20 inches from the base for umbrellas, and a draining trough fixed, it may be made still more useful. (*Trinidad Bulletin.*)

DEPARTMENT NEWS.

On the recommendation of the Commissioner of Agriculture the Secretary of State for the Colonies has appointed Mr. Henry A. Ballou, B.Sc., to be Acting-Entomologist to the Imperial Department of Agriculture for the West Indies. Mr. Ballou, who is twenty-six years of age, is a distinguished graduate of the Massachusetts Agricultural College. He has been a successful College Professor in Entomology and possesses special experience in field work in dealing with insect pests. He was engaged in 1896 in the fight against the Gypsy moth; afterwards in operations against insects attacking fruit, shade and ornamental trees. He has also had good experience in speaking at Farmers' Institutes and at meetings of the Connecticut Board of Agriculture. Mr. Ballou is due to arrive at St. Kitt's in s. s. *Fontabelle* on or about the 12th. instant. He will, at once, take up the duties of his appointment in that island and will afterwards visit Antigua, Montserrat, Dominica and St. Lucia.

The fourth number of the third volume of the *West Indian Bulletin* has been published, with title page and index to complete the volume. This number contains the concluding portion of Mr. H. Maxwell-Lefroy's paper on the 'Scale Insects of the West Indies,' and an account of experiments in the preparation of a 'New General Insecticide,' from crude oil and soap. The Hon'ble Francis Watts contributes interesting 'Additional Notes on West Indian Fodder plants.' Professor Dunstan's paper on 'Green Sorghum Poisoning,' reproduced by permission, is of special interest, inasmuch as it tends to clear up what has long been a disputed question. The other contents are Colonel Feilden's paper on 'The Birds of Barbados'; the 'Climatology of Antigua,' and 'Agricultural Efforts at Dominica.'

The number can be obtained from all agents of the Department, price 6d., or post free 8d.

The *Scale Insects of the Lesser Antilles*, Part II., has been issued as Number 22 of the Department pamphlet series. It contains descriptions, mainly illustrated with drawings, of thirty-one important West Indian Scale insects, with directions for their treatment, founded on careful experimental work. This and the former part, both by Mr. H. Maxwell-Lefroy, until recently Entomologist of the Department, should be in the hands of every cultivator in these colonies. Both may be obtained from the agents of the Department, price 4*d.*, or post free 5*d.* each.

The Shells of Barbados. In 1892 a paper appeared by Mr. E. A. Smith and Colonel Feilden, giving an account of the thirty-one land and fresh-water shells then known to occur in the colony. This group has recently been taken up by Mr. Lewis B. Brown; some of the results of his work appear as 'Notes on the Land and Fresh-water Shells of Barbados.' (The *Journal of Conchology*, 1902, pp. 266-273). Mr. Brown gives notes on the forty-six species, which he records for the island,—an addition of thirteen to the earlier paper—and summarizes, in tabular form, their distribution throughout the West Indies and South America.

NOTES ON BACTERIA.

The following is a brief abstract of a paper on 'Bacteria' read by Mr. L. Lewton-Brain, B.A., at a meeting of the Barbados Natural History Society, on January 14:—

A bacterium may be described as an exceedingly minute plant, only just visible under the highest powers of the microscope. It may have the form of a sphere, of a short cylinder, a long cylinder, or the cylinder may be more or less spirally twisted. It has no green colouring matter, and it is probably the most primitive of all living creatures. The largest bacterium *(Bacillus megatherium)* is a rod-shaped form; and it takes 2,500 of these, end to end, to measure an inch.

Whilst conditions are favourable, bacteria increase by simply dividing into two. When however conditions become less favourable, we get the formation of spores, resistant bodies from which the parent form can be reproduced. Some bacteria can thrive in ice cold water, others live and reproduce at 70° C. (158° F.), a temperature at which egg albumen coagulates. These and similar facts are important with regard to the question of the suitable treatment of stored foodstuffs.

STERILIZATION OF MILK, ETC.

Most bacteria are killed by an exposure of ten minutes to a temperature of 140° F. The spores are much more resistant and will even stand boiling for long periods. When they are cooled down they are at once ready to germinate and to go on dividing as rapidly as before.

Anthrax spores have been known to germinate after being kept dry for ten years.

To free air from germs, all that need be done is to pump the air through cotton-wool or some similar substance, which serves as a filter, the germs being retained in the meshes of the cotton-wool.

The sterilization of milk is an important question in connexion with the spread of infectious diseases. One of the best ways of sterilizing milk is to boil it; a very short boiling is sufficient to destroy almost any disease-producing bacteria. Thus the tubercle bacillus was killed by a temperature of

130° F. in 4 hours.
158° F. in 10 minutes.
203° F. in 1 minute.

while the cholera and typhus bacilli are capable of even less resistance, and are killed much more quickly. Unfortunately there are other bacteria usually present in milk, the spores of which are formed and resist boiling.

At present there is no practicable and certain method for use on a large scale by which milk can be freed from bacteria, without seriously altering its flavour and nutritive value. It is therefore the more essential that care should be taken to prevent these germs from getting into the milk, and the best method is to have absolute cleanliness in the dairy.

BACTERIA AND THE CIRCULATION OF NITROGEN.

Another process in which bacteria take a large part is in the circulation of nitrogen. Green plants are only able to take in their nitrogen in the form of nitrates which they obtain from the soil. Inside the green plant these are built up, stage by stage, into compounds of a very complex nature, known as proteids. These form the nitrogenous food of animals. Inside the animal body these proteids are broken down into simpler compounds, and finally the nitrogen is returned to the soil again in the form of urea, uric acid, etc., substances of no value as food to a green plant. But a bacterium, a *Micrococcus*, is able to take its nitrogen in the form of urea. It lives in this and secretes a ferment which changes urea into ammonium carbonate.

$$\underset{\text{(urea.)}}{CO(NH_2)_2} + \underset{\text{(water.)}}{2H_2O} = \underset{\text{(am. carb.)}}{(NH_4)_2CO_3},$$

and there are other bacteria which bring about the same change, and still other bacteria decompose uric acid, etc. The nitrogen is, however, still in a form in which it cannot well be taken up by the higher plants. But when ammonium carbonate is left in the soil we find that it becomes converted into salts of nitrous acid.

$$\underset{\text{(ammonia.)}}{NH_3} + \underset{\text{(oxygen.)}}{3O} = \underset{\text{(nitrous acid.)}}{HNO_2} + H_2O$$

This again has been found to be the work of a bacterium, which was first isolated and studied by a Russian botanist, Winogradsky. But this is not the end; in the soil there are other bacteria which living on the nitrous salts convert them into nitrates.

$$KNO_2 + O = \underset{\text{(potass. nitrate.)}}{KNO_3}.$$

In nature, of course, these changes go on side by side; and as soon as nitrites *(potass. nitrite)* are formed they are converted into nitrates. Nitrogen is now again in a form which can be taken up by green plants and the cycle begins afresh.

This however is not the whole process. It has been known for a long time that fertile soil loses a portion of its nitrogenous content in the form of free nitrogen which escapes into the atmosphere. It has since been proved that this also is due to the action of bacteria. They attack the nitrates formed by the nitrifying bacteria, and decompose them, giving rise to free nitrogen, which is simply lost to the soil. Some of these denitrifying bacteria, as they are called, can only act in presence of air, while others act only in the absence of air.

We will now consider how this free nitrogen from the air is brought into the cycle again. It has long been known that leguminous plants, such as peas and beans, flourish in soils to which no nitrogenous manure has been added.

At first this power of absorbing free nitrogen from the air was thought to belong to the leguminous plants themselves, and that it was taken in direct from the air through the leaves.

It was noticed that when leguminous plants were grown in ordinary soil their roots possessed lateral swellings or nodules both on young and old portions of the root system. In 1879 the great German agriculturist, Frank, discovered that these nodules were not formed when leguminous plants were grown in sterilized soil, thus proving that their formation is dependent upon the presence of bacteria existing in the soil.

The next step was a discovery by Hellriegel (1884-86), who proved conclusively that the absorption of atmospheric nitrogen by leguminous plants is directly connected with the development of the root nodules, which latter are produced solely by the action of certain bacteria on the roots.

Red Coloration in Milk. This may be due to several causes, one being an admixture of blood from a broken blood-vessel in the udder. When normal milk gradually becomes red on standing, micro-organisms are at work and the colouring matter excreted by these organisms is absorbed by the fat globules in the milk. Several bacteria are known to produce this red colour, the most frequent being *Micrococcus prodigiosus*, which also causes red spots on bread and other articles of food.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—February 17, 1903.—Messrs. A. E. De Pass & Co., Messrs. Kearton Piper & Co., Messrs. J. Hales Caird & Co., 'The Gardeners' Chronicle,' February 7, 1903 and 'The Public Ledger,' February 14, 1903.

Aloes—Curaçoa, 14/6 to 40/-; Barbados, 13/- to 35/- per cwt.

Arrowroot—St. Vincent, $1\frac{7}{8}$*d.* to 3*d.* per lb.
Balata—Demerara Sheet, 2/5 to 2/$5\frac{1}{2}$ per lb.
Bees-wax—£8 2.*s* 6*d.* to £8 10*s.* 0*d.* per cwt.

Cacao—T'dad, 58/- to 68/- per cwt. ; Jamaica, 50/- to 53/- per cwt. ; Grenada, 50/- to 57/- per cwt. ; Dominica, 46/- to 54/-.

Cardamoms—Mysore, 1/4 to 4/- per lb.

Coffee—Jamaica, 28/6 to 63/- per cwt. Peaberry 50/6 per cwt.

Cotton—West Indian, $5\frac{1}{4}$*d.* to $5\frac{9}{16}$*d.* per lb.

Fruit—
  Bananas—7/- to 12/- per bunch.
  Oranges—9/- to 24/- per case.
  Pines—2/- to 4/- each.
Fustic—£4 10*s.* to £4 12*s.* 6*d.* per ton.
Ginger—35/- to 60/- per cwt.
Honey—Jamaica, 18/- to 27/6 per cwt.
Isinglass—West Indian, 1/4 to 2/10 per lb.
Kola Nuts—1*d.* to 4*d.* per lb.
Lime Juice—Raw, 9*d.* to 1/- per gallon. Concentrated, £12 10*s.* to £13 per pipe.

Logwood—Small demand.
Mace—1/7 to 2/2 per lb.
Nitrate of Soda—Agricultural, £9 6*s.* 3*d.* per ton.
Nutmegs—70's to 64's, 1/9 to 2/4, 93's to 89's, 1/1 to 1/2.
Pimento—$2\frac{1}{4}$*d.* to $2\frac{1}{2}$*d.* per lb.
Rum—Demerara, 8*d.* to 10*d.* per proof gallon. Jamaica, 1/7 to 7/- per proof gallon.

Sugar—Muscovado, 10/3 to 13/6. Crystallized, 14/- to 15/6 per cwt.

Sulphate of Ammonia—£12 10*s.* 0*d.* per ton.

New York,—February 20, 1903.—Messrs. Gillespie Bros. & Co., and February 10, 1903.—American Gardening.

Bananas—Jamaica firsts, $1.00 to $1.10 ; eight hands, 80c. to 85c. per bunch.

Cacao—African, $12\frac{1}{4}$c. to $12\frac{3}{4}$c. ; Caracas, 14c. to 16c. ; Jamaica, $10\frac{3}{4}$c. to $11\frac{3}{4}$c., ; Grenada, $11\frac{1}{2}$c. to $12\frac{1}{4}$c. ; Trinidad, $12\frac{1}{4}$c. to $13\frac{1}{2}$c. per lb.

Cocoa-nuts—Trinidads, $15.00 ; Jamaicas, $17.00 to $19.00 per M.

Coffee—Rio, good ordinary $5\frac{5}{8}$c. ; Jamaica, fair to good ordinary $5\frac{3}{4}$c. to $6\frac{3}{4}$c. per lb. ; Manchester grades $8\frac{1}{2}$c. to $10\frac{1}{2}$c. per lb.

Ginger—Jamaica, $6\frac{1}{2}$c. to 7c. per lb.
Onions—Havana, per crate $1.50 to $1.75.
Pimento—$4\frac{5}{8}$c. per lb.
Rubber—Nicaragua scrap, 63c. to 64c. per lb ; Guayaquil strip, 57c. to 58c. per lb.

Sugar—Muscovado, 89°, $3\frac{1}{4}$c. per lb.; Centrifugals, 96°, $3\frac{3}{4}$c. ; Molasses, 89°, 3c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—February 24, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.
Molasses—12c per gallon, package included.
Sugar—$1.50 per 100 lb.

Barbados,—February 28, 1903.—Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb.
Cacao—Dominica, $13.00 per 100 lb.
Coffee—Jamaica, $8.00 to $9.00 per 100 lb.
Hay—New Brunswick, 90c per 100 lb.
Manures—Nitrate of Soda $60.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $80.00 ; Sulphate of Potash $67.00 per ton.

Molasses—12c. per gallon, and $4.00 per puncheon.
Onions—Madeira, $3.00 per 100 lb.
Potatos English—$1.80 per 100 lb.
Rice—Ballam, $4.25 to $4.50 per bag (190 lb.) ; Patna, $3.50 per (100 lb.); Rangoon, $2.60 per (100 lb.)

British Guiana,—February 25, 1903.—Messrs. Sandbach Parker & Co.

Arrowroot—St. Vincent, $8.00 to $9.00 per barrel.
Cacao—native 11c. to 12c. per lb.
Cocoa-nuts—peeled and selected $16.00 per M.
Coffee—Imported 12c. per lb. (retail.)
  —Creole, 10c. to $10\frac{1}{2}$c. per lb.
  —Dhal, $3.90 per bag of 168 lb.
Onions—4c. to $4\frac{1}{2}$c. ; Garlic 7c. to 8c. per lb.
Potatos, English—$3.00 to $3.25 per barrel.
Rice—Ballam, $4.75 ex store ; Patna and Seeta, $5.80 to $6.00 per bag.

Molasses—Vacuum Pan, yellow, 15c. to 16c. per gallon, casks included.

Sugar—Dark Crystals, $1.90 to 1.92\frac{1}{2}$; Yellow, $2.30 to $2.40 ; Molasses, $1.75 to $1.85 per cwt.
Timber—Greenheart 32c. to 40c. per cubic foot.
Wallaba Shingles—$3.00 to $4.75 per M.

Trinidad,—Messrs. Edgar Tripp & Co., February 26, and Messrs. Gordon Grant & Co., February 24, 1903.

Balata—No quotations.
Cacao—Ordinary, $12.00 to $12.10 ; Estates, $12.40 to $12.60 per fanega.

Coffee—6c. per lb.
Onions—$3.25 per 100 lb.
Potatos, English—$1.10 to $1.20 per 100 lb.
Rice—Yellow, $4.40 to $4.50 ; White Table, $5.40 to $5.75 per bag.
Sugar—Yellow Crystals for local consumption, $2.25 $2.50 per 100 lb.
  —Molasses sugar $1.75 to $1.80 per 100 lb.

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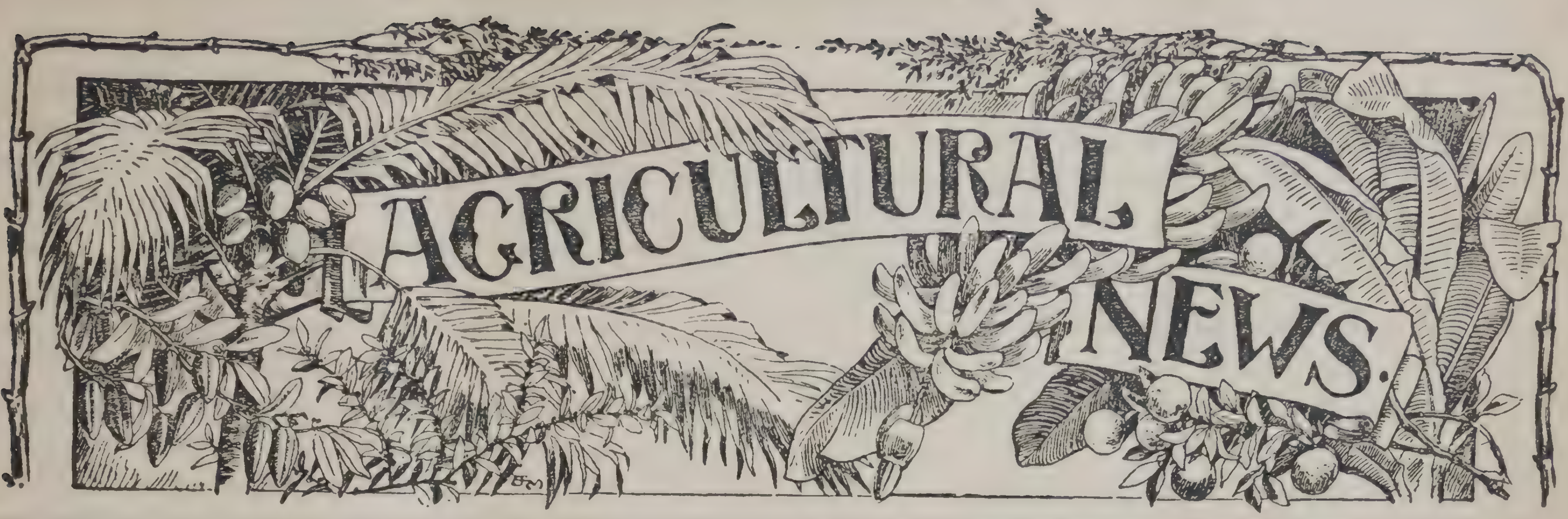

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The Cotton Industry.

IT is evident that the idea of re-establishing the cotton industry in the West Indies has been received everywhere with a good deal of interest. In an article in the Barbados *Agricultural Reporter* of March 19 the subject of cotton-growing is discussed as follows:—

'To-day, planters having come to realize that the establishment of auxiliary industries is actually essential to the continued existence of the sugar industry, are prepared to devote attention to the cotton industry, and to avail themselves of the valuable assistance of the Department of Agriculture in this direction, as in many others. Indeed, several acres of land have already been planted in cotton, and at a recent meeting of the House of Assembly a Bill for the protection and regulation of the sale of cotton was passed. The Legislative Council has also passed the Bill, which will, no doubt, receive the assent of the Governor and become law. Besides this, at a meeting of the Agricultural Society, held on Friday the 13th. instant, there was adopted a petition to be sent to the Governor-in-Executive Committee, praying the recommendation to the Legislature of the grant of a sum of £250 from the Public Treasury to assist in the establishment of the cotton industry. The petitioners propose that the sum named be placed at the disposal of Dr. Morris, the Commissioner of the Imperial Department of Agriculture for the West Indies. The text of the petition was published in the *Reporter* of the 14th. instant. It is to be hoped that the petition will meet with the favourable consideration of the Governor-in-Executive Committee, and that the grant asked for will be recommended to and be made by the Legislature.† That the present is an opportune moment for embarking on cotton cultivation is incontestable; that it is a suitable industry to be adopted as an auxiliary to our sugar industry is indisputable; and that there is a favourable outlook for cotton in the British Market is well known.'

---

† The grant was unanimously voted by both houses of the Legislature on March 24.

In addition, as will be observed from a communication published, elsewhere, in this Journal, the British Cotton Growing Association has expressed its intention to place at the disposal of the Commissioner of Agriculture 'the sum of £200 for distribution in the form of prizes amongst the West India Islands, excluding Jamaica, where a grant has already been made.' The Association will, also, 'send out a few gins, etc. when required.' It further announces that 'the Harrison Line, the Royal Mail Steam Packet Company and Messrs. Leyland & Co., have agreed to make a considerable reduction in freight charges on experimental cotton shipped from the West Indies, for two years.'

These facts are full of promise to those who are disposed to take up cotton growing. It is realized that it will be incumbent on the Department to put forth its best efforts with the view of determining the conditions and circumstances likely to yield the best results.

The first point to receive attention is the selection of the kinds of cotton likely to suit the requirements of the West Indies. The cotton so widely cultivated in the United States is Upland cotton. This is a short-stapled cotton—the fibre usually not exceeding an inch in length. In Upland cotton the seeds after ginning are covered with a fine down. What is known as Sea Island cotton is a special variety with a long, silky fibre an inch and a half in length. In the foolscap pamphlet, containing *Information relating to Cotton Cultivation in the West Indies*, recently published by the Imperial Department of Agriculture (p. 27), 'Sea Island cotton is recommended for cultivation in the West Indies side by side with the best varieties of Upland cotton.* The returns from Sea Island cotton are usually less than from Upland cotton; but the increased price obtained for it should more than compensate for the diminished yield.'

The Committee of the British Cotton Growing Association, it will be noticed, recommends 'that seed of Upland American or similar classes be used.' There is, it adds 'a steady demand for clean cotton 1¼ to 1½ inch staple. It would not be wise to grow too much of the Sea Island variety, the demand is limited and it requires more skill.'

There is an apparent divergence of opinion between the advice tendered by the Imperial Department of Agriculture and that given by the British Cotton Growing Association. This, however, can easily be explained. It is probable that in rather dry districts with thin soils, Upland cotton will thrive better and give more satisfactory results than Sea Island. The experience at Carriacou and at St. Lucia appears to point in this direction. On the other hand in many districts of Barbados, Antigua and St. Kitts where the soil, generally, is not only richer, but more highly cultivated, it is probable that Sea Island cotton could be advantageously grown. In the latter the seed, after ginning, is free from lint, and the fibre is long and lustrous. While the demand for Sea Island cotton is not so large as for Upland cotton, it is not improbable that the returns to the planters may be equally as good if not better. We are not without hope that eventually West Indian cotton, like Egyptian cotton may develop special characteristics and be in demand for purposes for which Upland cotton is unsuitable.

The season when cotton should be planted in the West Indies is gradually being determined. It is believed that early planting will produce better results than late planting. It is probable that in some localities, depending on the rains, cotton might be planted as early as the middle or end of May; in others June may be early enough. In any case it would appear advisable that cotton should not be planted, anywhere, later than the end of July or beginning of August.

The next point to settle is the distance apart at which the seed should be planted. Experiments carried on for five years at the Georgia Experiment Station (presumably with Upland cotton) appear to show that on land rich enough to produce 666 lb of lint per acre 'the best distance was 4 feet between the rows and 1 foot apart in the rows.'

In some experiments in the West Indies it is probable cotton has been planted too far apart. As a result the returns per acre are less than they should be and some disappointment has been felt. This is inevitable in all initial efforts. It is believed, however, that with closer planting the results will be more favourable and if so, there is no reason why cotton growing in these Colonies should not be undertaken with every hope of success.

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* Not necessarily in adjoining fields but each, in its own locality, according to the character of the soil and climate.

SUGAR INDUSTRY.

Antigua.

CENTRAL FACTORIES.

Sir Gerald Strickland is earnestly grappling with the difficulties connected with a scheme whereby some, at least, of the benefits of a Central Sugar Factory may be secured at Antigua.

At a recent Conference held at St. John's his Excellency, after referring to what had already been attempted in that direction, and the uselessness of urging proposals likely to be beyond the range of what His Majesty's Government would be able to sanction, suggested a scheme, the salient features of which are as follows:—

The Governor is prepared to recommend to the Secretary of State (and at this point it must be remembered that the proposals so far, and pending the approval of the Secretary of State, are but recommendations, which recommendations however his Excellency is prepared to use every effort to render effective) that the sum of £15,000 be offered for competition, to be awarded to that group of estates which can come forward with suitable substantial guarantees and undertake to put up the most effective small modern sugar factory, provided with at least double crushing, triple effet and appliances for making Refiners' Grey Crystals. Certain conditions will be attached to this assistance, one of which will be that the factory must undertake to manufacture, if offered, not less than 400 tons of sugar, or 20 per cent. of estimated capacity, for cane farmers or peasants, charging not more than one-quarter of the produce for manufacturing.

His Excellency is not in a position at this stage, to state positively whether this £15,000 may be given as a grant or bonus outright, or whether there may be some rate of interest, but he is prepared to recommend that it be a grant for considerations other than interest or mortgage.

In order that this money may be applied to the very best advantage, it is not proposed that this grant be handed over to the successful competing group of estates, but that it be applied in the purchase of actual machinery and appliances for the approved factory.

It now remains with those interested in the sugar industry to formulate and put forward proposals for the establishment of a small modern factory: these proposals may be submitted to his Excellency the Governor in the form of confidential tenders.

Should the Secretary of State approve of the suggestions now being made, these tenders will be considered and weighed one against the other and the grant be allotted to that tender which is held to offer the best advantages to all concerned, and most calculated to advance the general welfare of the Presidency, with due regard to the interests of the labouring classes.

It therefore remains to the planters to make the best proposals they can, but stringent guarantees will be required for the performance of all undertakings referred to in the tenders, otherwise the element of fairness in the competition would be endangered: upon this question of effective guarantee considerable stress would be laid by his Excellency.

As time is an important element in this matter, for everything must be completed so far as the Government is concerned before September 1, his Excellency proposes that those desiring to tender for this assistance shall send in their tenders in confidential form not later than Tuesday, March 31.

Field Treatment of Cane Cuttings.

Cane cuttings are liable to be attacked both by fungi and insects present in the soil. The cut ends of the cuttings, from which the sweet juice exudes, form a favourable nutrient medium for the germination of fungus spores, and when left uncovered there is a strong probability of fungus spores reaching them.

In a paper by Mr. A. Howard, formerly Mycologist to the Department, it was suggested that treating the ends of the cuttings with tar would prevent fungus spores germinating there and so infecting the cane plant (*West Indian Bulletin*, Vol. III, p. 73). In December 1902 a number of experiments bearing on this point have been carried out on various estates at Barbados under the superintendence of Mr. J. R. Bovell.

Ten series of experiments were carried out on four estates and five on another. On each of the first four estates 100 holes were planted for each experiment, on the fifth 2,820 holes were planted.

In the first and sixth series the cuttings were planted in the usual estate way, that is, soaked in water for twelve hours and planted, leaving the top ends uncovered.

In the second and seventh series the cuttings were soaked in water for twelve hours and planted, the top ends being covered with soil to a depth of ¼ inch. This, it was hoped, would prevent fungus spores reaching the top ends and also prevent insect attack.

In the third and eighth series after soaking in water the top ends of the cuttings were tarred, on planting the top ends were left uncovered.

In the fourth and ninth series the cuttings were treated as in third and eighth but on planting, the cuttings were covered with ¼ inch of soil.

In the fifth and tenth series both ends of the cuttings were tarred and the top end was covered with ¼ inch of soil.

The results of these experiments have, so far, proved inconclusive, the percentage of cuttings to germinate has been practically the same throughout, varying only from 72 to 81 per cent. This is probably due to the past planting season having been a very favourable one. It yet remains to be seen what the value of this treatment is during an unfavourable planting season.

Upwards of £10,000 worth of sugar is imported annually into Grenada. In order to encourage the re-development of this industry, the local Government has recently raised the tax on imported sugar to 1*d.* per lb.

FRUIT TRADE WITH GREAT BRITAIN.

Mr. Symington's Scheme.

As our readers are aware an attempt is being made by Mr. W. Weldon Symington, Chairman of the firm of Messrs. Thomas Nash & Co. of Plymouth, to establish a trade in fruit between some of the Lesser Antilles and Great Britain.

The fruit is proposed to be shipped, in the first instance, once a fortnight by the steamers of the Royal Mail Steam Packet Company, the Directors having promised, if sufficient inducement offer, to give special storage for the fruit, and to keep it ventilated by means of fans, etc.

Mr. Symington is now actively engaged in making experimental shipments of such fruits as are available, and it is hoped that the results will justify an extension of the area already planted in oranges, pine-apples and bananas and lead to the establishment of an important fruit industry in some of these islands.

The following reports of meetings held in connexion with Mr. Symington's scheme show that a good deal of interest is being taken in it:—

ST. VINCENT.

A Public Meeting was held at the Court House, Kingstown, on January 29, his Honour the Administrator in the Chair.

Mr. W. Symington presented an outline of his scheme, and the following resolution was unanimously passed:—

Having heard the outlines of Mr. W. Weldon Symington's scheme for finding an assured market, a rapid transit, and for providing a cash purchase of fruits from this island, on delivery at suggested local depôts:—

It is resolved. That this meeting representative of all classes of the community cordially desires to promote in every way his scheme and to further his efforts for the advantage of the colony and at the same time wishes success to the Royal Mail Steam Packet Company under their new management in their support of the scheme in furnishing the necessary carrying accomodation.

(2.) In the event of the Imperial Government not seeing their way to furnish the grant of £250 per annum for three years asked for to defray initiatory expenses, having regard to the benefits which would accrue so largely to our peasant proprietors, this meeting thinks it would be a legitimate course to use for this purpose a portion of the Soufrière Eruption Relief Fund now in the hands of the Government.

(3.) And requests that Mr. Chamberlain be asked to facilitate Mr. Symington in carrying the scheme into practical effect.

(4.) This meeting further desires that copies of this resolution be forwarded to his Excellency the Governor for transmission to the Right Honourable the Secretary of State for the Colonies, the Royal Mail Steam Packet Company and to Messrs. Thomas Nash & Co. of Plymouth.

ST. LUCIA.

A special meeting of the Agricultural Society was held at the Executive Chamber on February 6, his Excellency Sir R. Llewelyn, K.C.M.G., in the chair.

Mr. Symington explained the nature of his scheme, and after a general discussion the following resolution was adopted:—

That having heard the outlines of Mr. W. Weldon Symington's scheme for finding an assured market for the fruit grown in this island and for purchasing it for cash on delivery in local depôts, we hereby declare our approval of his scheme and our firm desire to support it in every way. We would further add that the success of any such scheme depends chiefly on inducing the Royal Mail Steam Packet Company to provide proper carrying accommodation. In the event of the Imperial Government declining to provide the grant of £250 per annum for three years to meet the initiative local expenses, we think it might properly be borne by the local Government having regard to the undoubted benefits which will acrue to the island from the establishment of this scheme.

DOMINICA.

Mr. A. K. Agar, Hon. Secretary of the Dominica Agricultural Society writes, that at a Special General Meeting of the Society held on February 13, Mr. W. W. Symington gave an outline of his proposed fruit scheme. The meeting was very largely attended and a keen general discussion followed Mr. Symington's speech, particularly on the question of the guarantees. Finally the following resolution was passed unanimously to be sent to the Secretary of State for the Colonies, the Royal Mail Steam Packet Company and Messrs. Thos. Nash & Co. of Plymouth:—

Resolved. That the Dominica Agricultural Society do pledge itself to give all reasonable support to Mr. Symington's scheme for promoting a fruit trade between Dominica and the British market.

Further, that in the event of Mr. Symington giving guarantees ensuring that the magnitude of his operations in Dominica will warrant such a course, this Society do express the earnest wish that the Imperial Government will, through the Department of Agriculture, grant to Mr. Symington such financial assistance as he now asks for.

TRINIDAD.

At a meeting of the Agricultural Society, held on March 10, his Excellency Sir A. Moloney, K.C.M.G., Governor of the colony in the chair, the following resolution was passed:—

(1.) This Society having had explained by himself the scheme of Mr. W. Weldon Symington, for promoting a fruit trade between this and other West Indian Islands and the United Kingdom, records its approval thereof as well as its intention to support it in every way it can.

(2.) That a copy of this resolution be forwarded to the Government for transmission to the Secretary of State for the Colonies, the Royal Mail Steam Packet Company and Messrs. Thomas Nash & Co., of Plymouth.

CURING ORANGES.

The great importance of good packing has been often dwelt upon in the *Agricultural News* with reference to West Indian fruit. Oranges are very liable to reach the market in poor condition unless they have been thoroughly well packed, and amongst the factors which contribute largely to the success or failure of a shipment of oranges is the 'curing' or as it is sometimes termed the 'hardening' of the fruit.

This subject was well dealt with by Mr. J. H. Hart at the second West Indian Agricultural Conference (*West Indian Bulletin* Vol. 1, p. 301). He said: 'No fruit should ever be packed when freshly gathered . . . Oranges should be picked at least three or four days before packing, and laid out in single layers until all the moisture, or what is known as the "sweat" of the fruit has disappeared. To pack fruit when wet or damp is to covet certain failure.'

Very similar advice is given in the *Journal of the Agricultural Society* of Jamaica for February, quoted from the *Florida Fruit Farmer*. It is there clearly explained that by the curing process the rind becomes slightly hardened and consequently less liable to bruising. One important point overlooked in the article referred to is the part played by fungi in causing the decay of fruit. It is suggested 'that it is the oxygen of the air penetrating into the little cracks and abrasions of the rind that cause decay.' Of more importance are the fungi which gain admittance through cracks and bruises. The real object in curing fruit is to obtain a dry rind on which the fungi cannot readily live, and a tough resistant skin, which not being readily bruised prevents these fungi obtaining access to the interior of the fruit.

CACAO DRIERS.

TRINIDAD.

Mr. J. H. Hart, F.L.S., has been good enough to examine, on behalf of the Department, the working of a cacao drier on a Trinidad estate. This drier, erected by Mr. Gordon of London, is capable of dealing with fifteen bags of cacao at a charge. This quantity is said to be dried successfully in forty hours. The cacao so dried is reported to be 'unbroken and excellent in quality.' Mr. Hart adds:—

The crop of one of our largest estates has been treated during the past season, and the owner states that he is perfectly satisfied with the work, and the prices realized for the cacao the machine has prepared are somewhat higher than those for sun-dried produce.

There are two Gordon driers now in use at Trinidad. Details in respect of the construction and working of these driers and particulars of cost may be obtained on application to Messrs. John Gordon & Co., 9, New Broad Street, London, E.C.

DOMINICA.

The following information is contributed by Mr. Geo. F. Branch, the Agricultural Instructor at Dominica. A full description with plan of the drier to which Mr. Branch refers appeared in the *Agricultural News*, Vol. I, p. 19:—

'A hot air cacao-drier exactly similar in construction to the machine in use at the Botanic Station (Dominica) has recently been erected at Clarke Hall estate, the property of Mr. Riviere. This drier has proved a thorough success. Six bags of cacao were cured with it in twenty-four hours, and I am informed by Mr. Riviere that nine bags per day (of twenty-four hours) can easily be dried. The fan, which is at present driven by hand is shortly to be worked by a water motor. Mr. Riviere states that before the erection of this drier his loss in mildewed beans during rainy weather was very considerable.'

Settlers' Allotments at St. Vincent.

In his report for February last, Mr. Osment, the Agricultural Instructor at St. Vincent, thus alludes to the efforts which are being made by settlers on the allotments in that island to plant their lands in provisions and permanent crops:—

Clare Valley: The settlers are making efforts to clear the new land given them and are planting provisions. The economic plants distributed to them from the Botanic Station are doing well. Few have died.

Camden Park: The plants distributed last month from the Botanic Station have been planted out. A few of these plants have died on account of the hot weather.

Park Hill and New Adelphi: The general appearance of the tenants' canes on these estates is good, and the provisions planted show vigorous growth. Settlers who have stock are doing all they possibly can to make up pen manure and some of them have built covered pens for preserving it. The boar at New Adelphi is in good condition. Since his arrival ten sows have been served by him, three of which now have litters.

Richmond Hill: With few exceptions, the settlers on this estate are steadily working their lands and planting provisions.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 96 of the last number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

VOL. II. SATURDAY, MARCH 28, 1903. No. 25.

NOTES AND COMMENTS.

Cassava Poisoning.

Cases of death from cassava are not infrequent in the West Indies. At Barbados recently two men, one 57 and the other 45 years of age, died from eating cassava, and during the last fortnight a boy of 9 died from the same cause. It is difficult to trace whether the roots in all cases were 'bitter' or 'sweet' cassava. The latter is generally regarded as wholesome and free from poison. On the other hand, there can be little doubt as shown in the *Agriculture News*, Vol. I, p. 5, (from investigations made by a former and the present Government Chemists at Trinidad) that some sorts of sweet cassava contain an appreciable quantity of poison and, if not cooked well and heated throughout in order to drive out the poison, are capable of causing sickness and even death. At Barbados it is probable that the want of fuel is responsible for many of the deaths from cassava poisoning that have occurred in that island. The Department has prepared a leaflet (No. 7) containing hints and information in regard to cassava poisoning with simple directions as to the treatment of persons taken ill after eating cassava.

This leaflet is available for distribution all over the West Indies and may be obtained from the Agents of the Department at nominal cost.

Cotton in the West Indies.

The following letter has been received by the Commissioner of the Imperial Department of Agriculture for the West Indies from the Secretary of the British Cotton Growing Association, dated Oldham, February 25, 1903:—

Your letter of January 12 duly to hand. This Association is delighted that you are taking such a very active interest in cotton growing in the West Indies.

I am instructed to tell you that a letter has to-day been sent to Mr. Antrobus of the Colonial Office, stating that this Association is willing to place at your disposal the sum of £200 (two hundred pounds) for distribution in the form of prizes amongst the West Indian Islands, excluding Jamaica, where a grant has already been made.

In addition, the Association will be glad to take charge of any cotton forwarded and realize the same to the best advantage. My Committee are anxious to have a good consignment as early as possible.

The Harrison Line, the Royal Mail Steam Packet Co., and Messrs. Leyland & Co., have agreed to make considerable reduction in freight charges on experimental cotton for two years. This should act as a great incentive. My Committee will send out a few gins, etc., when required.

From samples already received, my Committee recommend that seeds of Upland American or similar classes be used: there is a steady demand for clean cotton about 1¼ to 1½ inch staple. It would not be wise to grow too much of the Sea Island variety; the demand is limited and it requires more skill.

My Committee will be pleased to receive as much information as you can send them. Hoping your efforts to re-establish the cotton industry in the West Indies will be successful.

Cotton.

In an able article discussing cotton cultivation, the Barbados *Agricultural Reporter* of March 19 states: 'that the present is an opportune moment for embarking on cotton cultivation is incontestible; that it is a suitable industry to be adopted as an auxiliary to our sugar industry is indisputable; and that there is a favourable outlook for cotton in the British market is well known.'

Yams in Great Britain.

Among the various West Indian vegetables suggested as suitable for exportation to England, the yam has been considered as one of the most likely to succeed, being apparently more suited to English tastes than the sweet potato. The following paragraph appeared in the Barbados *Agricultural Reporter* of March 16:—

Another attempt is to be made, says the *Fruit Grower*, to popularise the yam, which grows to great perfection in the West Indies. If a real attempt is made to introduce the yam on a commercial scale into England, we would give a word of caution to the senders. Care must be taken that only the white cooking variety is sent here. There is not the slightest chance for the dark cooking varieties to find a place in British cookery; but for the white, mealy varieties we have ourselves a great liking. We remember many years ago participating in a meal of Jamaica yam which proved an immense success, and we have always wondered why this particularly useful and pleasant vegetable is not better known in this country. Great care must, however, be taken in selecting the samples to be sent here.

West Indian Locust Gum.

In December last a fine specimen of the gum of the locust tree of these islands *(Hymenaea Courbaril)* was received from Mr. Murdo McNeill, the Agricultural Instructor at Grenada. This was obtained from Granton Estate in that island. In forwarding the specimen, Mr. McNeill writes: 'The tree is common on the higher lands throughout Grenada although not found in large numbers in any particular locality. It is a valuable timber tree, useful wherever great strength and toughness are required. As this is the best specimen of the gum I have seen, I am interested to know if it has any commercial value.'

The sample of gum which resembled gum Anime was submitted to Messrs. Burgoyne Burbidges & Co., 12 & 16, Coleman Street, London, who reported as follows:—

'We have the honour to acknowledge receipt of your kind favour of February 11, as also the specimen of gum referred to, and in reply, beg to say that the sample you have sent us appears to us to be a specimen piece of gum Copal. This article meets with a good demand here at prices ranging from 30*s*. to 45*s*. per cwt. according to quality, and we recommend a trial shipment.'

Science at Harrison College, Barbados.

We publish on page 106 of this issue, the reports of the examiners on last year's agricultural science examination at Harrison College. It will be noticed that the science examiner reports that a very high standard was attained in both Agricultural Chemistry and Botany, while a satisfactory, if somewhat lower, standard, was reached in the other subjects. In the technical papers the examiner reports that a more practical view has been taken than was the case last year, and that there is a satisfactory absence of bad mistakes. He states that, generally, the results are very satisfactory and that the work being done at Harrison College should prove of great value to agricultural progress in Barbados.

Volcanic Dust in Barbados.

Following on the severe eruption of the Soufrière of St. Vincent on March 22, 1903, Barbados, 90 miles to the east, experienced a third fall of volcanic dust. The fall at Bay Mansion, Bridgetown at the south-east corner of the island, was carefully observed by Dr. J. W. Spencer, F.G.S., who has kindly supplied the following facts:—

The cloud of volcanic dust reached the zenith at about 9 a. m., this gives the cloud a velocity of over 40 miles per hour. The cloud was of a deep Prussian blue colour, and was so dense as to cut off all direct light from the sun. As the cloud advanced it became more grey and covered the horizon with the exception of a narrow zone to the east, this was also obscured about noon, but simultaneously the light began to penetrate the cloud in the region of the sun. The darkness was so intense, just before this time, that it was impossible to read even large type. The fall of dust began about 11.15 a.m. and increased till 1.30 p.m., when the quantity steadily diminished till it was hardly perceptible at 5 p.m. The ashes were dark grey in colour. The cloud as it advanced towards Bridgetown came in a direction opposite to the prevailing wind at the time. The axis was apparently from a point a little north of St. Vincent, suggesting that the cloud was first carried northwards, and then east. The cloud also appeared much denser towards the north and completely covered the northern horizon before it obscured the southern. The height of the cloud as it reached here was about 8,000 feet or double the height of the Soufrière, but after the ashes began to fall the lower strata were at a much less height; probably at St. Vincent the cloud was 3 miles high. The quantity that fell was about 6,000 lb. to the acre. If 3 tons be taken as an average of the fall in Barbados, 300,000 tons must have fallen on the island.

At Codrington House, two miles north of Bridgetown, the total fall was calculated as 6·52 tons to the acre. The first dust fell at 11.15 a.m., the greatest fall was observed during the first hour, and none appeared after 4.15 p.m.

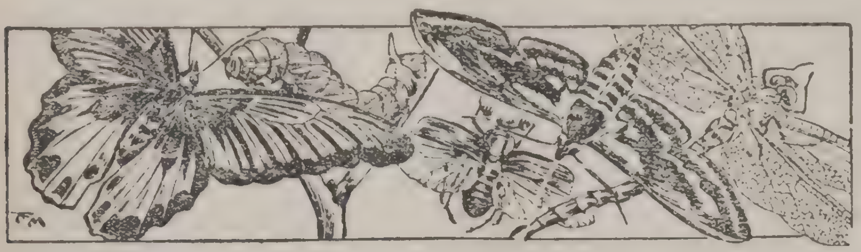
At Atlantis Hotel, Bathsheba on the windward coast about fourteen miles north-east of Bridgetown, the cloud was first noted at 9 a.m. in the south to south west. It was then of a dark blue colour. The first dust fell at 11.15 a.m., the colour of the cloud had by this time changed to a rusty brown. At no time was it so dark that artificial lights were necessary in the hotel. Apparently the fall of dust was considerably less than at Bridgetown.

Sir Nevile Lubbock.

It has been decided to present a testimonial to Sir Nevile Lubbock, K.C.M.G., 'in recognition of his long and valued services to British Guiana and the West Indies.'

This proposal is one that will appeal to all connected with these colonies, and especially in view of the active and successful part taken by Sir Nevile Lubbock in getting rid of the continental Sugar Bounties.

The Secretary of the West India Committee (A. E. Aspinall, Esq.,) will be happy to receive subscriptions and it is the wish of the Committee to make the testimonial 'as handsome a one as is befitting to our West Indian Colonies.'



INSECT NOTES.

The Mole Cricket.

The mole cricket is a serious enemy of young plants, lawns, etc., in several West Indian islands, notably St. Vincent and St. Lucia, and is known to occur also in Dominica and Trinidad.

The mole cricket is said to be a serious pest to agriculture at Porto Rico, where it is known locally as the 'changa.' The following extract is taken from *Bulletin No. 2*, of the Porto Rico Agricultural Experiment Station, of the United States Department of Agriculture:—

> The changa is a comparatively large insect of the order *Orthoptera;* its habits are subterranean and nocturnal; its food consists largely of roots of plants. The female lays her eggs in the galleries underground. The life of an individual is about one year. Its enemies are lizards and birds, but since these are strictly diurnal in habit, the changa suffers comparatively little from them.
>
> The damage to crops in this island by the changa amounts to probably more than $100,000 annually. The crops injured most are cane, tobacco and rice; a few crops are exempt from attack. The depredations extend over the entire year.
>
> Comparatively little damage is done in clayey soils; moist, sandy loam is preferred. Saturation and extreme dryness of the soil are conditions which prevent the changa's operations.
>
> The old method of protecting the roots of seedling plants with mamey leaves is more or less deleterious to the plants; but the great cheapness of this method commends it to the tobacco grower. The coarse wire gauze cylinder is recommended for tomatos and valuable plants.
>
> Clean cultivation, both before and after planting crops, is recommended, because a large portion of the changa's ordinary food supply is thus cut off. Hilling up is also recommended where practicable. Special search with hoe or spade soon after a rain may be relied upon to some extent in small plats.
>
> Ploughing during the winter and spring months will bring to the surface numbers of the eggs and young larvae, and this exposure to their enemies will result in the death of a large percentage of their numbers.
>
> Trap lights are recommended for use on nights when the changa is flying in numbers. A dim light is nearly useless. A large lantern having a reflector and set at the edge of a field or a lantern with no reflector set in the middle of a field, will give best results.
>
> Arsenic or Paris green sprinkled on chopped grass is the best bait; this poison should be distributed in small patches or narrow rows just beneath the surface of the soil.
>
> Napthalin placed in the ground about plants serves to repel the changa, but its use is warranted only in small and badly infested areas.

House Ants.

Many remedies are proposed for cockroaches, ants and other household pests, and whilst some persons find one effective, others pin their faith on another and regard all the rest as frauds and snares. It may be useful to publish some methods of destroying ants in houses which have been tested and found, by the writer, to give good results. The first is published in *Bulletin No. 30* of the United States Department of Agriculture, Division of Entomology, p. 97. Mix 10 parts of sugar with 100 parts of water and boil: cool, and then add one part of tartar emetic and stir. Set this about in tins and other receptacles covered with muslin or wire netting, so that the ants can obtain access, but not domestic animals. This is a good method. A very similar one is to use, in exactly the same way, a mixture of one ounce of jam or syrup and the grains of finely powdered corrosive sublimate. This is a useful poison, and makes the ants very sick.

Another simple remedy, involving no poison, is to soak a piece of sponge in sweetened water. Place this where ants are likely to be and after some hours, when it is full of ants, drop it into boiling water and then sweeten it afresh for a second lot of ants. Ants are curiously intelligent when once they have grasped an idea.

The laboratory at the Office of the Department was at first infested with black ants that came in from outside. The use of poisoned jam, carbolic acid and the molasses and boracic mixture soon taught them not to come in and they now confine their operations to the outside of the building, in spite of the many temptations within, in the form of captive insects, food stuffs, etc. A small amount of perseverance and personal attention to the matter, with a use of good poisons, soon clears ants out of a building.

A Short Life.

Fallen fruits such as mangos will be found to be very soon infested with maggots of the small fruit flies (*Drosophilila*, etc.) which are attracted by the smell of the fruit. Bananas and other fruits also attract these flies. Some of these flies were recently reared to determine the length of their life. A mango was partially peeled and exposed to the flies and then removed to allow the eggs laid by the flies to hatch.

The following notes show the sequence of events:—

Exposed mango to flies June 27, 12 a.m.
Removed mango „ 28, 8 a.m.
Large maggots found July 1, 8 a.m.
Puparia (Chrysalids) found July 2, 8 a.m.
First fly seen July 5, 2 p.m.

The whole life-history thus occupied eight days from the earliest time the eggs could have been laid till the fly emerged. This is shorter even than that of the common mosquito (*Culex pungens*) stated by Dr. L. O. Howard to have a minimum life-history period of ten days.

COTTON.

Cultivation at Carriacou.

The following report on the present condition of the Cotton Industry at Carriacou has been communicated by direction of Sir Robert B. Llewelyn, K.C.M.G. It was prepared by Mr. McNeill, Agricultural Instructor at Grenada, who visited Carriacou for the purpose on the suggestion of the Commissioner of Agriculture:—

There are at present seven gins working in the island—two at Hillsborough, owned by Messrs. Paterson and Sylvester Joseph; one at Dover belonging to Mr. Mitchell Cox; two at Grand Bay, owners, Messrs. Belmar and Drummond; one owned by Mr. James Henry and one at Harvey Vale belonging to Mrs. Gordon. All the gins are of the same pattern—H. S. Emery's patent saw gin, makers: W. J. & C. T. Burgess, late Burgess & Key, Brentwood, England. Four of these are driven by steam and three by wind power. The cost of one of these (29 saws) landed in Grenada was £60 8*s*. 4*d*. Prices vary according to size, but the owners as a rule could not state the prices. The price of an engine and boiler imported from England two years ago was £135 13*s*. 3*d*. The best engine in the island, belonging to Mr. Mitchell Cox, was imported from America about a year ago—'The Clipper,' (makers: The Blymer Iron Works Co., Cincinnati, Ohio). The price was less than that stated above, but exact figures were not given. It is fitted with gear for pumping water and for pressing the cotton.

Gins of 35 saws driven by steam are said to clean an average of 6 bales, in a day of 10 hours. Those driven by wind do not work so steadily and average less in a day. A good deal of foreign matter, pieces of straw, etc., pass through the machines with the lint, owing to the saws and other parts of the machinery getting out of order, and this causes a slight reduction in the value of the cotton.

The kind of press in general use in the island is the Victoria screw press. The first cost of one of these was £85 13*s*.; landed in Grenada £103 4*s*. It requires six men to press one bale of cotton.

The owners of gins charge 7*s*. for ginning a bale of cotton (300-310 lb.). Cartage from field to mill, pressing, baling, and cartage to port are included. The owners of the cotton provide cloth, rope and twine for baling. All the gins, with the exception of one, are conveniently situated close to the shore for shipping the produce. Formerly the price charged for ginning was $3 per bale. With the introduction of steam engines the price was reduced to 9*s*. and subsequently to the present figure.

The price paid, locally, for raw cotton is 8*s*. 4*d*. per 100 lb. or 1*d*. per lb.

KINDS OF COTTON.

There are at least two distinct kinds of cotton grown in the island locally known as Marie-galante and Sea Island cotton, specimens of which are forwarded with this report. The Marie-galante is more robust in habit and bears larger capsules. This is the kind generally grown. Plants of the Sea Island cotton are usually found growing among the Marie-galante, but many of the planters are in the habit of cutting them down and supplying the vacancies with the favourite kind. In travelling through the island one hears of Silk cotton as well as Sea Island cotton, but I understand from authorities on the subject that they are synonymous terms.

With regard to the proportion in weight between seed and lint, the current opinion is that Marie-galante gives one-third its weight in lint, whereas it takes about 1,200 lb. Sea Island cotton to give a bale of the usual weight.

CULTIVATION.

Most of the cotton on the island is grown on the 'Metaire' system. The planting season is from May to August, but with the method practised of allowing the plants to remain in the ground for an indefinite period, seeds are only sown when new fields are to be planted or supplies made. There is no regular method of replanting exhausted fields. The distance between the plants varies from 2½ to 4 or 5 feet. Three to four feet is the average distance. As a rule each labourer gauges his own distance which accounts for the variation in that respect. In planting, the surface of the ground is simply chopped up with the hoe where the seeds are to be sown and about a dozen put in, these are thinned down to three or four after they commence to grow. The old plants are cut back each year to within a foot of the ground. Corn is planted between the rows in May before the cotton is cut back, and it is generally some distance above the ground before the pruning of the cotton takes place. The corn is cleared off the land in August and September. The average yield is said to be between fifteen and twenty barrels per acre, worth from 4*s*. to 8*s*. per barrel according to the time of the year. Peas are generally planted between every fifth or sixth row of cotton, sometimes closer and sometimes wider. Cassava and ochros are also occasionally planted between the rows.

Three weedings are annually given by those working on the 'Metaire' system. The first is given in June, the time for the others is regulated by the rate at which the weeds grow. No other tillage is given and no manure is applied.

PICKING.

Small pickings are sometimes made in December, but the bulk of the picking is done in March and April. Women and sometimes children are employed for this work. The average daily picking for one person is 30 ℔. to 40 ℔., for which 6*d*. is paid. Cost of picking averages about ½*d*. for every ℔. of lint.

YIELD.

The average yield of the island is said to be much less than a bale per acre. It is stated to be as low as ½ bale per acre in many places. The following is a statement by Mr. A. H. Stiell with regard to the yield and other important points about cotton: 'When I was manager of Grand Bay and Mount Pleasant estates I measured off 18 acres which I planted with picked seeds of Marie-galante—the seeds were hand picked, steeped in a bucket of water and all the light ones which floated thrown away. The yield from this piece was 20 bales (310 ℔. each) of clean cotton. This kind of cotton takes 900 ℔. gross, to give 300 ℔. net. The Marie-galante being of a very thick texture can remain on the trees when open for several days, and if fallen, can be picked up without earth adhering. The Sea Island cotton takes about 1,200 ℔. to give a bale of 310 ℔. It is flimsy and easily taken away by the winds, therefore more attention has to be paid to picking soon after opening. It gets spoilt when it falls on the ground. During March and April the bulk of cotton is reaped from the valleys. Hills give the bulk in February. Planting under the 'Metaire' system is done from May to August. Those planted late in the season do not grow so tall as those planted in May and June, which is considered an advantage.'

The cotton is taken from the field in ordinary bags, ginned, weighed and baled. It is exported to England through agents in St. George's. Freight, commission, dock dues, etc., amount to about 3*d.* per lb. The seed is also sent to England and was recently fetching about £6 per ton.

There is no doubt that a great improvement could be made in this industry and a larger yield per acre obtained by (1) planting improved varieties, (2) better tillage, and (3) manuring. With regard to improvement by introducing special kinds of seed, I beg to quote a paragraph in reference to this matter from a letter written by the late James Paterson, dated June 4, 1895, who was one of the principal planters in the island, to the Curator of the Botanic Station. 'We grow cotton year after year from the same plants; on two occasions I imported Egyptian seeds and our late Governor, Sir W. Hely-Hutchinson, imported some cotton seeds which he sent to the Police Magistrate for distribution among certain planters. These importations have certainly improved the quality of the cotton in some districts.'

Tillage, as already seen, is practically restricted to the stirring of the surface soil three times in the year when the land is being weeded. The kind of manure best suited for the cultivation of cotton in Carriacou is a question that has yet to be solved.

I venture to suggest that this is an opportune moment, when an effort is being made to establish a peasant proprietary in the island, for starting an experiment cotton station among the proposed peasant lots on Beausejour estate. The 'Metaire' system is responsible to a great degree for the comparatively small yield of the island as the labourer gets his crop with as little expenditure of energy as he can. Under this system there is little hope for improvement in the people's methods of cultivation. An experiment station will prove useful in many ways: the best kinds of cotton could be tested and distributed among the people; good tillage practised and results compared with those from the ordinary cultivation. Various methods of planting and pruning could be tried and manurial experiments carried out besides being generally a model plot for the surrounding peasantry.

I, therefore, recommend that an ordinary sized lot, four or five acres, in a convenient place on Beausejour estate, be reserved for this purpose, under the control of the Agricultural Department, and a small subsidy be given to one of the best planters in the island for looking after it and carrying out the instructions issued by the Agricultural Department for its working. Cotton cultivation, on the whole, is simple and inexpensive, and the returns from a four or five-acre lot should go a long way towards paying the expenses incurred in a scheme of the kind.

The outlook for the current year's crop is considered good.

Agriculture in Madras.

Mr. C. A. Barber, F.L.S., formerly Superintendent of Agriculture in the Leeward Islands and now Government Botanist at Madras, has been appointed on the staff of the Department of Land Records and Agriculture in the Madras Presidency as expert adviser in Economic Botany. During the year 1901-02, Mr. Barber 'continued his investigation of the damage caused to the date palm by beetles and also devoted attention to the mode of tapping and general life of the palms in the Gódávari district on which an interesting report was submitted after the close of the year. He also paid some attention to a pepper-vine disease in the Wynaad, to the investigation of which the planters have desired the deputation of an expert.'

EDUCATIONAL.

Harrison College, Barbados.

NATURAL SCIENCE REPORT.

The following is the report on the recent examinations in Natural Science, conducted by the Local Examinations and Lectures Syndicate of the University of Cambridge, dated January 30, 1903:—

I have now the honour to present to you my report on the work in Natural Science of the Harrison College, Barbados, the examination of which I have just completed.

Classes were presented for examination in Agricultural Chemistry, Agricultural Botany, Heat, Light and Meteorology and two classes in Practical Chemistry.

In Agricultural Chemistry two very good papers were received and the others were good. On the whole a very high standard was attained. The question on 'nitrification' was answered well by all. In nearly all cases the questions which were well done were the same, and the same remark applies to those answered indifferently well.

In the papers in Agricultural Botany, also a high standard was attained. The answers to the questions on systematic botany and morphology were good; those on physiological botany were not so satisfactory. There was little or no attempt to write an *essay* on plant movements; a mere catalogue of various movements was given in most cases.

The general standard attained in the paper on Heat, Light and Meteorology was not so high as in the two previous papers. There was some slight confusion about definitions and the description of experimental processes was often weak and inadequate. It was clear, however, that certain parts of the subjects had been thoroughly grasped.

A fair and very uniform standard was attained by the First Year Class in Practical Chemistry. The class requires more training in the power of observation and in drawing the correct inferences from their observations. The Second Year Class in Practical Chemistry were also remarkably uniform. The exercise in qualitative analysis was creditably performed in nearly all cases. In the quantitative work the value obtained was in all cases too high; two of the results, however, were satisfactory.

The spelling of some candidates was occasionally faulty.

(Sgd.) H. O. JONES, M.A.,
Clare College, Cambridge.
Countersigned on behalf of the Syndicate,
J. H. FLATHER, M.A.,
Assistant Secretary.

AGRICULTURAL SCIENCE REPORT.

The examination in agriculture was conducted by Mr. H. H. Cousins, M.A., F.C.S., Island Agricultural Chemist of Jamaica. His report dated January 12, 1903, is as follows:—

Five candidates were examined and it is creditable both to the teachers and the taught that all have passed. The standard was remarkably equal throughout. The Principles of Agriculture was the best paper, two candidates attaining to the standard for distinction in this subject. It was satisfactory to note the general absence of bad mistakes. A more practical view of the subject was presented than last year and I was pleased with the answers on drainage and grasses which displayed practical sense. The subject of manures was not well treated. Not a single student quoted correct prices and composition. I would suggest more attention to this point in future. I expected more local information on the subject of 'Green Manuring' and some allusion to the Barbados Experiments thereon.

Technical Tropical Agriculture. This paper was answered almost uniformly by all the candidates, and was somewhat discounted by a failure to grasp the essential points involved in several of the questions. The 'qualities of a good cane' was well handled, except that no candidate had any knowledge of

D. 95—a cane of general if not of local interest. No candidate gave a satisfactory account of the composition of a ripe cane, the figures again being frequently absurd. The Muscovado process was well described, but the suggested improvements thereon were not marked with a practical insight into local conditions and possibilities. I would advocate the handling of this subject with a special study and consideration of the sugar industry of the island. The process of making rum advocated would produce a spirit too clean to be even 'Common' in Jamaica. It is to be regretted that no adequate account of Rum Manufacture is available to the student. On the whole, I consider this subject has been treated to more practical purpose this year than last, but further efforts are desirable to make the subject more truly technical.

The *Practical Sugar Chemistry* was correctly attempted by all the candidates. No method however good can compensate for a lack of accuracy in results of analysis, and the marking was to a considerable extent based on the accuracy of the results obtained. From the results of the 'Rum' determinations, I would suggest that a specific gravity bottle be used instead of the Tralles Hydrometer for such a purpose as this. The errors of dilution and of the instrument in the hands of students are evidently excessive. With practice, all these students should be able to undertake reliable work in a sugar laboratory, since they have evidently been well instructed in the best methods of such work. I consider the results obtained in the whole examination are very creditable and that the effect of such an addition to the course of studies at Harrison College must be decidedly favourable to the future agricultural prospects of Barbados.

(Sgd.) HERBERT H. COUSINS, M.A., Oxon., F.C.S.,
Island and Agricultural Chemist,
Jamaica.

Barbados.

LECTURE TO TEACHERS.

Dr. Longfield Smith delivered the sixth of his Lectures to Teachers at Harrison College on Saturday March 21. The subject of the lecture was 'Plants.' The lecturer pointed out the differences between flowering and flowerless plants, and described the seeds of various flowering plants and their germination. He dealt with the microscopic structure of plants, and described briefly the chief points in the structure and functions of the root and shoot. The structure of the flower was also described and mention was made of the ways in which pollination is brought about. The next lecture will be given at Speightstown on April 4.

British Guiana.

LECTURES TO TEACHERS.

A course of lectures in Agricultural Science for certificated teachers and third and fourth year pupil teachers is announced to take place at Queen's College on Saturdays. Teachers who attend not less than three-quarters of the lectures given each month will be repaid second class railway and ferry expenses. Those who reside at places where no public conveyances are available will be allowed a travelling allowance at the rate of 5 cents per mile. The first lecture was to be given on March 14.

Gardening for Women. One essential to success in gardening is a love for it. Given this and intelligence to first plan carefully and afterwards carry out the plans with perseverance, gardening will be found a successful, pleasant and congenial occupation for women. Many of them could do much better at floriculture than at working for the very low wages paid them in the cities. It is not so much labour and muscle, nowadays, as brains and machinery. Don't do your work first and your thinking afterwards, but think and plan first and then work.

WEATHER NOTES

St. Lucia.

The rainfall return for St. Lucia for 1902 has recently been published by Mr. J. C. Moore, the Curator of the Botanic Station in that island. The highest fall recorded during the year was 122·99 inches at Errard estate in the Dennery district; the lowest, 79·34 inches in the Revière Dorée district. In Castries, the chief town of the island, the rainfall was 91·43. The average rainfall at seven stations in St. Lucia during 1902 was 103·23 inches.

Montserrat.

The rainfall for Montserrat for 1902 has just been published. The highest fall, 76·25 inches was at Harris' Experiment Station, the lowest, 49·66 inches at Cemetery. The average rainfall at thirteen stations in Montserrat, in 1902 was 60·49 inches.

BREEDING ZEBU CATTLE FOR BEEF.

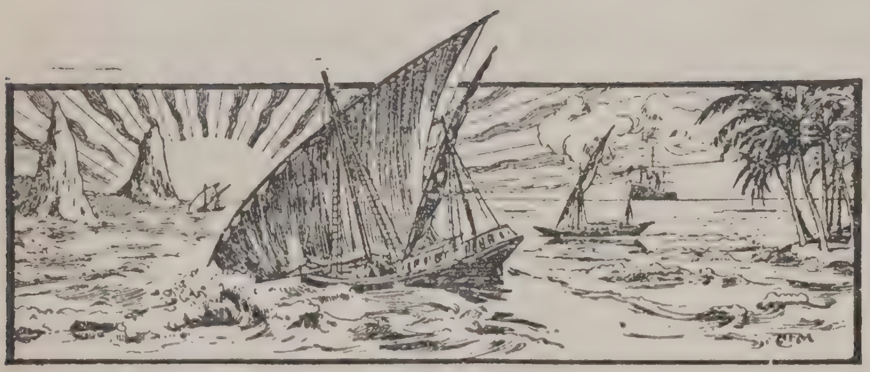
Dr. R. A. Stoute, Veterinary Surgeon to the Government of Barbados, has contributed the following suggestions for improving the breed of Zebu cattle in respect to their qualities as beef-producing animals:—

There are three characteristics possessed by Zebu cattle which it would be well to develop in any beef breed.

(1.) Smallness of bone in proportion to size.
(2.) Immunity from ticks.
(3.) Power of obtaining nourishment from hard, coarse fodder.
(4.) Great foraging power.

Were I asked the best means of producing these characteristics, or at least which I considered the best means, I would suggest the following:—

Obtain as nearly as perfect a bull as possible from the breed decided on, (presumably Short horn, Hereford or Polled, Red or Black), select some pure-bred Zebu cows, as nearly approaching the build of a beef breed as possible. Cross these with the bull decided on. Castrate all bull calves and divide the heifers into three lots of four calves each. One lot of about four calves I would keep at pasture day and night; lot No. 2, I would keep at pasture during the day, and pen or tether at night; lot No. 3, I would keep always tied. Keep a record of weights taken about every month, and from these different lots only breed from those that had developed well, and had the three characteristics wanted, accompanied by form of father. Breed these to same bull, as the idea of in-and-in breeding has lost the dread it once had. In fact some breeders maintain this is the best way to reach a point of excellence. Treat calves from these in the same manner in which the mothers were treated. Again breed to the same bull and continue until $\frac{1}{8}$ Zebu and $\frac{7}{8}$ pure breed has been reached. From the last lot of calves I would keep a few of the best marked as brood bulls.



GLEANINGS.

Mr. Watts in a brief letter by last mail mentions cane B. 147 as 'apparently suiting St. Kitt's conditions and now that the planters understand its character they are pleased with it.'

On the occasion of the visit of Sir Robert B. Llewelyn, K.C.M.G., to the Agricultural School, St. Vincent, on March 10, his Excellency made the following entry in the Visitors' Book:—

'I congratulate the management on the present condition of the Institution and the happy and healthy appearance of the boys.'

We learn that at a recent meeting of the Grenada Agricultural Society it was decided to order sixty copies of each issue of the *Agricultural News* for free distribution amongst its members.

We learn that the District Agricultural Show proposed to be held at Mount Rich, St. Andrews, Grenada, on April 1 and 2 next, has been postponed until later in the year.

According to the *Port-of-Spain Gazette* the Trinidad cacao crop, now nearly over, has been a record one. The exports in 1903 are stated to be 11 million pounds as compared with 9 million pounds in 1902. The prices in the local markets, on February 26, varied from $11 to $11.90 for good red ordinary to $12.50 and $12.75 for fine estate marks.

According to Mr. C. W. Meaden, Manager of the Government Farm at Trinidad, pig-breeding is handicapped in that island because bats attack and injure the 'nipples' of the sows. Styes for breeding sows should, therefore, be protected in order to render them bat-proof at night.

Amongst the journals which are doing their best to foster better trade conditions between the West Indies and Canada, a prominent position must be given to the *Maritime Merchant*, published at Halifax, Canada.

The issue for February 26, contains under the head of 'West India Topics' an account of Onion cultivation in the West Indies, and notes on other subjects of immediate interest in these colonies.

Mr. Osment, the Agricultural Instructor at St. Vincent, reports that the peasant land holders on the New Adelphi Settlement have commenced reaping their canes. The sugar is manufactured at the estate works which are kept in order by the Government for the purpose. So far the people are said to be satisfied with the yield and prices obtained.

Several additions and improvements to the buildings at the Agricultural School, St. Vincent, have recently been completed. Among these may be mentioned a laboratory and lecture room, stable and poultry shed. Concrete drains have also been constructed wherever necessary.

A Naval correspondent who is evidently keenly interested in Agricultural progress in the West Indies writes:—'I hope that the efforts of yourself and the staff of Instructors may be, eventually, crowned with success, although the progress must be slow and tedious since you have to build upon a bed-rock of ignorance and prejudice, the legacy of a hundred years of apathy and indolence.'

'Therefore train, train, and train thoroughly your rising generation to use their eyes and brains to solve the many problems Nature offers, and which, if solved satisfactorily, will make fortunes where now beggary exists.'

The Hon'ble Sydney Olivier, C.M.G., Chairman of the Board of Agriculture for Jamaica, it is said, will leave the colony on six month's leave of absence in May next.

The *Demerara Argosy* contains a long list of economic plants offered for sale by the Botanic Gardens, British Guiana, including grafted citrus fruits, mangos, and other tropical fruit trees, Brazil nuts, bananas, nutmegs, cacao, coffee, vanilla, rubber and fibre plants. The prices range from two to twenty-five cents each, with special quotations per dozen and per hundred.

The *Port-of-Spain Gazette* reports that the sugar campaign in Trinidad is in full swing and that a fairly good crop is anticipated. Farmers' canes are being purchased at 9*s*. per ton, exclusive of the Government grant of 1*s*. per ton.

We have heard with great regret that the half-bred short-horn bull lately obtained by the Department for the stock farm at Antigua has died from fever. This is a great loss as it was anticipated that this animal was exactly what was desired to improve the quality of beef-cattle in the island.

According to an advertisement in the Jamaica *Daily Telegraph*, the clerk of the Bath Corporation is prepared to supply 'germinated seeds of the famous Talipot palm *(Corypha umbraculifera)* at 1*s*. 6*d*. per plant, in pot.'

The Curator of the Botanic Station at Dominica reports that he has recently received some nuts of the *Coco-de-Mer* kindly presented by the Administrator of the Seychelles. It is hoped that from some of the nuts, plants of this very interesting palm will be secured to the Gardens.

The efforts of the Department to maintain a serial publication containing scientific and agricultural information, plainly worded and suited to West Indian conditions, are evidently appreciated abroad as well as in these islands. Monsieur J. Vilbouchevitch of the *Journal d'Agriculture Tropicale*, the leading French publication devoted to agriculture in the tropics, writes: 'Le *Agricultural News* est un petit bijou;' while Sir William Thiselton-Dyer, F.R.S., K.C.M.G., Director of Kew, and Botanical Adviser to the Colonial Office, speaks in equally high terms. In his opinion, the *Agricultural News* is 'an excellent paper.'

DEPARTMENTAL REPORTS
AFM

JAMAICA: BOARD OF AGRICULTURE. OBSERVATIONS ON VARIETIES OF SUGAR-CANE. 1902. By H. H. Cousins, M.A., F.C.S.

This report by Mr. Cousins, the Government Agricultural Chemist, records the results of the experimental growth of 100 varieties of canes, from various sources, grown on comparative lines at the Hope Experiment Station, and of experimental results obtained at Cinnamon Hill, St. James, and at Worthy Park.

Favourable results were obtained with B. 147, D. 80 and B. 254. The first gave juice of excellent purity and low glucose ratio: the last gave the largest yield of sugar and rum, but its juice was only moderately pure. Mont Blanc, a variety identical with the White Transparent, is the standard Jamaica variety, and is well spoken of.

The author has made arrangements to carry out cross fertilization experiments and looks to increased cane tonnage rather than to increased richness for the future improvement in the sugar-cane. For former mention of this report see *Agricultural News*, Vol. II, p. 75.

SUGAR-CANE EXPERIMENTS IN THE LEEWARD ISLANDS 1901-02. PART I. EXPERIMENTS WITH VARIETIES OF SUGAR-CANE. PART II. MANURIAL EXPERIMENTS. By F. Watts, B.Sc., F.I.C. F.C.S., and others.

The experiments have been carried out on seven estates in each of the islands of Antigua and St. Kitt's, by the Hon'ble Francis Watts and Messrs. Sprankling, Shepherd and Lunt, under the direction of the Imperial Department of Agriculture.

The objects of the first series of experiments are (1) to find disease-resistant varieties, (2) to discover a cane the equal and perhaps the superior of the Bourbon as regard sugar production, etc.

The best cane of the year in both Antigua and St. Kitts has been the Barbados seedling B. 208. The Demerara No. 95 also occupies a high position, and it is worthy of careful attention by the planters.

The Chemical Selection experiments are of interest as indicating a possible method of improving the yield of sugar in certain varieties by selecting the richest canes for plants.

Mr. Watts points out that it is possible to grow good crops of plant canes without the use of artificial manure, by employing pen manure, green dressings etc. This is a confirmation of the previous year's results. With ratoons, however, nitrogenous artificial manures are necessary and potash and phosphates give small increases.

A new feature has been introduced in this report by the addition of a series of diagrams illustrating the results of the different series of experiments.

Part I. of this report was published in September 1902, but owing to delay in connexion with the preparation of the diagrams, Part II. has only recently been issued.

THE WORK OF THE EXPERIMENT STATIONS AND LABORATORIES OF THE HAWAIIAN SUGAR PLANTERS' ASSOCIATION, 1902. By Dr. C. F. Eckart, Director and Chief Chemist.

This report gives the results of planting various quantities of seed-cane in the cultivation furrows in use in Hawaii. Five plots of Lahaina and five of Rose Bamboo varieties were planted respectively with:—

(1) One eye per 12 inches
(2) One continuous cane in row
(3) One eye per 6 inches
(4) Two continuous canes in row
(5) One eye per 18 inches

The average of two crops come out in the order above given, the plot planted with one eye per twelve inches giving the largest return.

Twelve varieties of cane were tested (in single plots?) and the results of the two crops (plants and ratoons) show that the variety called Louisiana Tibboo Mird comes out first with an average indicated sugar yield of 25,580 ℔. per acre, followed by Louisiana Striped variety with an indicated sugar yield of 24,500 ℔. The West Indian Seedlings D. 95, and D. 117 gave 23,362 ℔. and 19,722 ℔. respectively in the same series of experiments.

The author continues his results on the investigation of soil exhaustion and a calculation is made of the amounts of different soil constituents removed per pound of sugar by certain varieties. This apparently shows that some canes are greedier feeders than others, in proportion to the sugar produced by them. Demerara No. 74 and Lahaina are stated to be especially economical varieties.

The larger portion of the report is devoted to a description of lysimeter investigations upon the effects of irrigation of the sugar-cane with brackish water, that is, water contaminated with a rather large amount of salt. Amongst other points of interest the author concludes that where the irrigation is excessive the water may contain a considerable amount of salt, but that the use of such salt water leads to rapid soil exhaustion in lime, magnesia and potash.

THE ST. VINCENT SOUFRIERE.

The St. Vincent *Sentry* of February 27, contains an interesting description of an ascent of the Soufrière and of the crater lake written by Dr. E. Howe of the United States Geological Survey, from which we extract the following:—

The lake, far below, was continually agitated by puffs of steam, and at the centre at very regular intervals of about one and a half minutes, geyser-like eruptions of relative violence were taking place. Without warning a large puff of steam rises and instantly countless rockets of black mud and stones are shot up through it, spreading outward slightly, so that for one brief moment the effect is that of a giant, black bamboo. Then the mud and stones fall back with a roar, black ripples extend slowly shoreward over the lake, and clouds of steam rise on the windward side of the crater to descend in a fine mist, each drop of which leaves a muddy spot on drying, showing that even with these very insignificant eruptions, finely divided material is carried upward in suspension by the steam above the rim of the crater. Coarser material lies everywhere about the crater's lip and not a little had been very recently ejected, for the marks which the stones made on falling in the loosely consolidated lapilli were still fresh.

AGRICULTURAL AND SCHOOL GARDEN SHOWS.

Trinidad School Garden Shows.

TUNAPUNA.

The first school vegetable show, since the colony was divided into four districts, took place, as announced, at the Government school house, Tunapuna, on Friday, February 20. The building was nicely decorated for the occasion, and the show proved a success. Twenty-nine of the thirty-two schools included in the district competed. The exhibits, which numbered 146, were laid on tables extending the whole length of the school room. Among the exhibits from the school gardens were tannias, yams, potatos, melongena, peppers, peas, pumpkins, cabbages, onions, radishes, tomatos, plantains, bananas, cassava, ochros, cucumbers, beans, turnips, lettuce, carrots, etc. Mr. J. H. Hart, the Superintendent of the Royal Botanic Gardens, assisted by the Agricultural Instructors Messrs. W. Leslie and H. A. Nurse, acted as judge of the exhibits.

His Excellency the Governor, Sir Alfred Moloney, delivered an interesting speech on the occasion, full of encouragement to the teachers and pupils alike. He suggested that fruit be included in future exhibitions with a view to encouraging the development of a fruit trade from Trinidad.

COUVA.

The first annual vegetable show, for the produce of school gardens in the Couva centre was opened by his Excellency Sir Alfred Moloney, K.C.M.G., at the Couva Government School. There are thirty-nine schools in this district, thirty of which have gardens, and of these twenty-two sent exhibits numbering 153 and consisting of plantains, bananas, tannias, peppers, turnips, carrots, christophines, sweet potatos, yams, cassava, melogena, cucumbers, French beans, ochros, tomatos, etc. The show was on the whole a successful one.

His Excellency in the course of his speech on the occasion referred to the 'wholesale larceny' that went on in connexion with the gardens and promised to use every possible means in his power to discourage this. He also suggested the cultivation of cotton, for which he thought there was a considerable area of land, and he hoped to introduce good seed a little later to encourage the industry.

SAVANNA GRANDE.

The vegetable show for the produce of school gardens in district of Savanna Grande was held at the Drill hall. The number of exhibits on show was 148, comprising French beans, cucumbers, lettuce, cabbages, melongena, ochros, tomatos, sweet potatos, cassava, plantains, bananas, tannias, peppers, etc. According to the judge's (Mr. Hart's) report, there was room for considerable improvement, but on the whole the exhibits attained a fair standard of merit. His Excellency Sir Alfred Moloney, in the course of a speech on the occasion considered the result highly creditable to managers, teachers and scholars. Referring to praedial larceny from school gardens, his Excellency remarked that such an offence was punishable by flogging and said that he would not hesitate to confirm any such sentences. He again referred to the movement on foot for the development of an export fruit trade.

Montserrat Agricultural Show.

An Agricultural and Industrial Show was held at Montserrat on February 27 under the auspices of the Imperial Department of Agriculture The show was held at the Market; the total number of exhibits was 585 as against 340 at the Show of two years ago; there were 190 entries of a heterogeneous nature of articles not enumerated on the prize list. Class iv. (fruit) was well represented in bananas, jams and jellies. There was the usual number of exhibits of prepared meals and starches. The samples sent, however, were small. In Class ix. (stock and poultry) there were thirty-eight exhibits. Special prizes offered by his Honour the Commissioner and Mrs. Watkins incited much competition and a large number of exhibits were entered, among them being yams, onions, farine and drawn thread. Varieties of sugar-cane, sweet potatos, cassava, honey in section and in jars, ginger, arrowroot, tannier eddos and onions in crates ready for market. were prepared and staged by officers of the Department of Agriculture. Also tools loaned by the Head Office and bee-keepers' appliances were on view. For the benefit of those present frames of honey were uncapped and the honey extracted with Cowan's honey extractor, and milk separated and butter churned with a Victoria cream separator, and an 'Erin' butter churn.

On the whole the show was a great improvement upon that held two years ago, the exhibits were better, and with one or two exceptions more neatly presented. It is worthy of note that the chief exhibitors were of the peasant proprietor class. After the distribution of the prizes, his Honour the Commissioner referred to the importance of such shows, and thanked the Imperial Department of Agriculture for the interest displayed not only in this but in other matters tending to the welfare of the island.

Dominica Agricultural Show.

The fifth annual Agricultural Show at Dominica was held in the Bath Estate on Wednesday, February 11. Owing to the appointment of district committees the show was a great advance on previous ones. The greater number of the prizes were given to peasant proprietors. The exhibits shown by the boys of the Agricultural School were especially good. The show was opened by his Honour H. Hesketh Bell, the Administrator. In his speech his Honour said that he greatly regretted that Dr. Morris was unable to be present and see the great advance that the Presidency was making both in its staple products and in a number of minor industries. He was pleased to note the increasing interest that was being taken by the planters and peasants in the outlying districts of the island, and congratulated the local committees on the way in which they had done their work.

Antigua Agricultural Show.

The Agricultural Show was held on February 20, in the ground of Buxton Grove. The Show was opened by his Excellency Sir Gerald Strickland, who in his speech pointed out that agriculture must remain the chief industry of the island. He was pleased to see such a splendid display of exhibits which indicated a revival of confidence and contentment.

Grenada Agricultural Show.

The Agricultural Exhibition which was announced to be held at Mount Rich on April 1 and 2 (see *Agricultural News*, Vol. II, p. 43) has been postponed. It is hoped that the Exhibition will be held in November next.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—March 3, 1903.—Messrs. A. E. De Pass & Co., Messrs. Kearton Piper & Co., Messrs. J. Hales Caird & Co., 'The Gardeners' Chronicle,' February 28, 1903, and 'The Public Ledger,' February 28, 1903.

Aloes—Curaçoa, 14/6 to 40/-; Barbados, 13/- to 35/- per cwt.

Arrowroot—St. Vincent, 1⅓*d.* to 3*d.* per lb.

Balata—Demerara Sheet, 2/2 to 2/8 per lb.

Bees-wax—£7 10*s.* to £8 10*s.* per cwt.

Cacao—T'dad, 59/- to 67/6 per cwt. ; Jamaica, 50/- to 55/6 per cwt. ; Grenada, 51/- to 55/6 per cwt. ; Dominica, 50/- to 55/- per cwt.

Cardamoms—Mysore, 1/4 to 4/- per lb.

Coffee—Jamaica, 29/- to 63/- per cwt. Peaberry, 50/- to 52/6 per cwt.

Cotton—West Indian, 5½*d.* to 5⅞*d.* per lb.

Fruit—

Bananas—8/- to 12/- per bunch.

Oranges—9/- to 15/- per case.

Pines—2/- to 4/- each.

Fustic—£4 10*s.* to £4 12*s.* 6*d.* per ton. (Prices unchanged.)

Ginger—35/- to 60/- per cwt.

Honey—Jamaica, 20/- to 23/6 per cwt.

Isinglass—West Indian, 1/8 to 2/9 per lb.

Kola Nuts—1*d.* to 4*d.* per lb.

Lime Juice—Raw, 9*d.* to 1/- per gallon. Concentrated, £13 per pipe.

Logwood—Small demand.

Mace—1/7 to 2/2 per lb.

Nitrate of Soda—Agricultural, £9 5*s.* per ton.

Nutmegs—70'*s* to 64'*s*, 1/9 to 2/4, 93'*s* to 89'*s*, 1/1 to 1/2.

Oil of Limes—Distilled, 1/2 per lb.

Pimento—2⅛*d.* to 2⅜*d.* per lb.

Rum—Demerara, 8*d.* to 10*d.* per proof gallon. Jamaica, 1/7 to 7/- per proof gallon.

Sugar—Muscovado, 10/3 to 12/6. Crystallized, 14/- to 15/6 per cwt.

Sulphate of Ammonia—£12 10*s.* 0*d.* per ton.

Tortoise Shell—15/6 to 24/6 per lb. Selected, 47/- per lb.

New York,—February 20, 1903.—Messrs. Gillespie Bros. & Co.

American Gardening.

Bananas—Jamaica firsts, $1.00 to $1.10 ; eight hands, 80c. to 85c. per bunch.

Cacao—African, 12¼c. to 12¾c. ; Caracas, 14c. to 16c. ; Jamaica, 10¾c. to 11¾c. ; Grenada, 11½c. to 12¼c. ; Trinidad, 12¼c. to 13½c. per lb.

Cocoa-nuts—Trinidads, $15.00 ; Jamaicas, $17.00 to $19.00 per M.

Coffee—Rio, good ordinary 5⅝c. ; Jamaica, fair to good ordinary 5¾c. to 6¾c. per lb. ; Manchester grades 8½c. to 10½c. per lb.

Ginger—Jamaica, 6½c. to 7c. per lb.

Pimento—4⅝c. per lb.

Rubber—Nicaragua scrap, 63c. to 64c. per lb ; Guayaquil strip, 57c. to 58c. per lb.

Sugar—Muscovado, 89°, 3¼c. per lb.; Centrifugals, 96°, 3¾c. ; Molasses, 89°, 3c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—March 10, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—12c per gallon, package included.

Sugar—$1.55 per 100 lb.

Barbados,—March 14, 1903.—Messrs. James A. Lynch & Co., and Messrs. T. S. Garraway & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb.

Cacao—Dominica, $12.50 per 100 lb.

Coffee—Jamaica, $8.00 to $9.00 per 100 lb.

Hay—New Brunswick, 90c per 100 lb.

Manures—Nitrate of Soda $60.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $80.00 ; Sulphate of Potash $67.00 per ton.

Molasses—13c. per gallon, and $4.00 for puncheon.

Onions—Madeira, $3.00 per 100 lb.

Potatos English—$2.05 per 100 lb.

Rice—Ballam, $4.25 per bag (190 lb.) ; Patna, $3.50 per (100 lb.); Rangoon, $2.60 per (100 lb.)

Sugar—In hogsheads $1.45 per 100 lb., and $5.00 for hhd. In bags $1.70 per 100 lb.

British Guiana,—March 11, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8.00 per barrel.

Cacao—native 11c. to 12c. per lb.

Cassava Starch—$7.00 per barrel.

Cocoa-nuts—$8.00 to $10.00 per M.

Coffee—Rio and Jamaica 11c. to 12c. per lb. (retail.) —Creole, 11c. to 12c. per lb.

Dhal,—$3.90 to $4.00 per bag of 168 lb.

Eddoes—$1.56 per barrel.

Molasses—Vacuum Pan, yellow, 15c. to 16c. per gallon, casks included.

Onions—4c. to 5c. ; Garlic 7c. to 8c. per lb.

Pea Nuts—Curaçoa, 3¾c. ; American, 5c. per lb. (retail).

Plantains—32c. to 48c. per bunch.

Potatos, English—$2.00 to $2.50 per barrel.

Rice—Ballam, $4.75 ex store ; Patna and Seeta, $5.80 to $6.00 per bag.

Sweet Potatos—Barbados, $1.08 per barrel.

Tannias—$1.80 per bag.

Yams—$1.92 per bag.

Sugar—Dark Crystals, $1.95 to $2.00 ; Yellow, $2.30 to $2.50 ; Molasses, $1.40 to $1.60 per cwt.

Timber—Greenheart 32c. to 55c. per cubic foot.

Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—Messrs. Edgar Tripp & Co., March 12, and Messrs. Gordon Grant & Co., March 12, 1903.

Balata—40c. to 41c. per lb.

Cacao—Ordinary, $12.10 to $12.25 ; Estates, $12.50 to $13.00 per fanega.

Coffee—6c. per lb.

Molasses—Bright Eastern Muscovado, 21c. to 22c. per gallon, f.o.b.

Onions—$3.00 to $3.25 per 100 lb.

Potatos, English—$1.30 to $1.40 per 100 lb.

Rice—Yellow, $4.25 to $4.60 ; White Table, $5.25 to $6.00 per bag.

Sugar—Yellow Crystals for local consumption, $2.25 to $2.40 per 100 lb.
—Molasses sugar $1.75 to $1.90 per 100 lb.

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[33.]

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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

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Corn Breeding.

PLANT breeding is now well recognized in many parts of the world as one of the most important methods at the command of modern agriculturists to improve their crops. At the Experiment Station, Urbana, Professor G. C. Hopkins, of the University of Illinois, has been working for many years on the improvement of Indian corn. The results of his investigations are of great interest to planters in the West Indies, and a summary of them will appear in the forthcoming number of the *West Indian Bulletin* (Vol. iv. No. 1.). We propose now to draw attention to some of the salient points, and to endeavour to indicate how they may be applied to West Indian conditions.

The food material contained in a corn grain consists mainly of protein, starch and oil. All varieties of corn do not contain these constituents in the same relative proportion. Some are rich in starch and correspondingly poor in protein; in others the proportion of protein is high and of the starch low.

In the United States distinct markets exist for different varieties of corn. Glucose and starch manufacturers require a corn rich in starch. Stock raisers in the northern states prefer a grain with a high percentage of protein. The oil also is in varying demand; the manufacturers of corn oil cannot at present get a corn containing enough to meet their requirements, whilst the bacon raisers find that the average corn contains 'too much oil for the production of the hard, firm bacon' for export. The practical importance of Professor Hopkins' work is that he shows how races of corn may be reared to meet these varying requirements. In the West Indies there is not as yet a demand for various kinds of corn. It would, however, be undoubtedly remunerative to planters to raise corn for estate use rather than to continue importing enormous quantities as at present.

One direction in which the corn grown in the West Indies may be improved will serve as an example. As has often been pointed out in the *Agricultural News*, and is now, we are glad to find, practised in the West Indies to some extent, molasses forms an excellent stock food, provided it can be supplemented with some other food of higher protein content. An effort might then be made on estates to raise corn of high protein content. Instructions as to how this can be done will be found on page 126 of this number.

The ordinary corn grown in the West Indies contains 10 or 11 per cent. of protein. Is it impossible to increase this to, say, 12 or 13 per cent.?

Dr. Hopkins furnishes an instance which proves that this is not only possible but practicable and, too, within a very few years. He obtained some seed of a variety of corn known as 'Burr's White.' Plants were selected for low and high protein contents respectively. At the end of only four years the characteristics of two plots were as follows:—The low proteid corn contained an average of 9·20 per cent. of protein, the lowest ear containing 7·80 per cent. The plot bred for high protein gave an average yield of 12·48 per cent. of protein, the richest ear containing 15·71 per cent. A difference of over 8 per cent. protein between the extremes and of 3·28 per cent. between the averages of the whole plots was thus obtained as the result of only four years breeding on definite lines from one original stock.

Supposing for the sake of argument that the protein in the West Indian corn could be increased by only 2 per cent. by careful selection, what would be the value of this improvement to the planter?

To estimate this it is necessary to remember that the protein is the most valuable constituent of the corn, and that, if the average value of the whole corn is, say, 2 cents per lb., the protein in it is worth about 10 cents per lb.

The ordinary yield of corn per acre in the West Indies is at present low, due to its being grown only as a catch crop, often planted at wide distances apart, and receiving but little attention and care. Ten bushels an acre may perhaps be taken as an average crop; this is in round numbers about 600 lb. From a ten-acre field 6,000 lb. of corn would be obtained, containing with 10 per cent. of protein, about 600 lb. of protein. Increase the protein by two per cent. and we obtain 720 lb. in place of 600 lb.

At the rate quoted above, 600 lb. of protein would be worth to the planter about $60.00. With the improved corn he would obtain $72.00 worth of protein from the same area, and with the same cultural expenses. In other words, he gets an increased profit of $12.00 from ten acres.

Such results as these are well worth careful attention. They may be attained without the aid of elaborate chemical analyses, and with no more apparatus than a penknife, an observant eye and the expenditure of a certain amount of care and time. The results are not for one crop only, but practically for all time, so that the actual gain is far greater than in the estimate given above. Moreover, we have discussed the result of a small improvement, in one direction only. With increased yield per acre as obtained by Mr. Sands at Antigua, the additional profits would be multiplied accordingly.

We recommend Dr. Hopkins' paper to the earnest consideration of all planters and scientific workers in the West Indies.

THE CARE OF PASTURES.

The general advantages to be obtained by treating pasture land in a careful and systematic manner have already been discussed in this journal (Vol. I, p. 37), and our readers should consult that article, which also gives references to other papers giving fuller information on the subject. The care of pastures is an important question, well worth the consideration of all cattle and stock farmers in the West Indies.

A recent issue of the *Bulletin* of the Botanical Department, Trinidad, has an interesting article on the subject, in which the more important points to be observed are summarized as follows:—

(1) Pastures should be laid off in small well-fenced areas.
(2) The land should be systematically drained.
(3) Each section should be regularly 'fed down' and well trampled.
(4) Pastures should be regularly cleaned and weeded, after being 'fed down,' and before the seeds of weeds have ripened.
(5) Selected grasses and low-growing fodder plants should be encouraged, and sedges and weedy plants discouraged.
(6) Regular attention should be paid to the conservation of manure, ashes and all vegetable refuse, which in convenient form should be returned to the soil.
(7) Due provision should be made for the protection of cattle from sun, wind and rain, by planting shade trees and by building suitable shelter sheds.
(8) Fire should be used only for disposing of brush wood, and seed weeds.
(9) A good supply of clean water should be maintained.
(10) Sufficient cattle should be maintained to keep pastures clean.

SUGAR INDUSTRY.

The Extraction of Sugar.

The following table has been compiled by the Hon'ble Francis Watts, Government Analytical and Agricultural Chemist for the Leeward Islands.

The table shows the quantity of juice and cane required for the production of one ton of sugar under different estate conditions. It is calculated for juice of four different strengths, namely, 2·0, 1·8, 1·6 and 1·4 ℔. of sucrose per gallon. When the juice contains the quantity of sugar per gallon mentioned at the top of the column, the results in the factory under the conditions stated will be those given in the column below.

Pounds of cane-sugar per Imperial Gallon of juice	2·00	1·80	1·60	1·40
Total Solids	2·272	2·045	1·818	1·592
Purity	88%	88%	88%	88%
Specific Gravity $\frac{30}{15\cdot5}$C.	1·0834	1·0748	1·0660	1·0574
CASE I.				
Crushing by mill per cent.	75	75	75	75
Extraction per cent.	88	88	88	88
Gallons juice per ton sugar	1273	1414	1591	1818
Tons cane per ton sugar	8·21	9·05	10·10	11·44
CASE II.				
Crushing by mill per cent.	70	70	70	70
Extraction per cent.	88	88	88	88
Gallons juice per ton sugar	1273	1414	1591	1818
Tons cane per ton sugar	8·80	9·69	10·82	12·26
CASE III.				
Crushing by mill per cent.	60	60	60	60
Extraction per cent.	83	83	83	83
Gallons juice per ton sugar	1350	1499	1687	1927
Tons cane per ton sugar	10·78	11·99	13·38	15·16
CASE IV.				
Crushing by mill per cent.	55	55	55	55
Extraction per cent.	83	83	83	83
Gallons juice per ton sugar	1350	1499	1687	1927
Tons cane per ton sugar	11·87	13·08	14·60	16·54
CASE V.				
Crushing by mill per cent.	60	60	60	60
Extraction per cent.	78	78	78	78
Gallons juice per ton sugar	1436	1595	1795	2051
Tons cane per ton sugar	11·57	12·75	14·24	16·14
CASE VI.				
Crushing by mill per cent.	55	55	55	55
Extraction per cent.	78	78	78	78
Gallons juice per ton sugar	1436	1595	1725	2051
Tons cane per ton sugar	12·63	13·91	15·53	17·60
CASE VII.				
Crushing by mill per cent.	55	55	55	55
Extraction per cent.	74	74	74	74
Gallons juice per ton sugar	1514	1682	1892	2162
Tons cane per ton sugar	13·31	14·66	16·26	18·56
CASE VIII.				
Crushing by mill per cent.	50	50	50	50
Extraction per cent.	74	74	74	74
Gallons juice per ton sugar	1514	1682	1892	2162
Tons cane per ton sugar	14·61	16·10	17·97	20·36

Cases I and II may be taken as representing the degrees of efficiency of factories making vacuum pan sugar. Case III represents the best work of a muscovado factory, which is seldom if ever realized in practice. Cases VI, VII and VIII represent conditions commonly met with in the muscovado industry.

DEFINITIONS.

Total Solids. The quantity of substance in solution in cane juice including sugar and impurities.

Purity or Coefficient of Purity. The proportion of cane-sugar to 100 of total solids. Calculated by dividing the total solids into the cane sugar and multiplying by 100.

It has been assumed at 88 for the purposes of these calculations.

Crushing. The weight of juice expressed by the mill from 100 parts by weight of canes.

Extraction. The amount of marketable sugar obtained from every 100 parts by weight of cane sugar in the juice.

ROOT ROT OF TANNIAS.

An account of a disease which is causing some loss to the 'Taro' or 'Tannier' crop in Hawaii is given by Mr. T. F. Sedgwick in *Bulletin No. 2* of the Hawaii Agricultural Experiment Station, Honolulu.

Plants affected are recognized easily either by their stunted appearance or by the unusual bluish-green or yellowish colour of the leaves. The plants can be very readily pulled up owing to the fine feeding roots having rotted.

It was noticed that when tannias are planted in virgin soil or in soil which has been planted in rice or some other crop, the plants will remain healthy for several seasons.

The addition of chemical manures was found to be beneficial. These should be applied before the tannias are planted and thoroughly mixed with the soil. The field should then remain unplanted for as long a period as possible and again cultivated before the hules are planted.

The disease is said to attack the plant in two ways, and it is suggested that there may be two distinct diseases, one due to a fungus or bacterium, but no evidence is given to support this view.

It is recommended that the water which covers the fields be kept constantly running or, at least, changed at frequent intervals.

A disease of tannias similar to or identical with that described by Mr. Sedgwick appeared in Jamaica in 1887 and was investigated by Mr. Massee of Kew. Mr. Massee found that the disease was due to a fungus, nearly related to the one which causes the potato disease in England and it is called *Peronospora trichotoma.* Whether this is the cause of the disease in Hawaii remains to be investigated.

West Indian Hams. Mr. C. W. Meaden, the Superintendent of the Government Farm at Trinidad, is devoting his attention to ham curing. Referring thereto the Trinidad *Mirror* says that, 'for a first trial, Mr. Meaden's Trinidad hams are very good, although there is room for improvement.' His success warrants them in 'recommending him to make another trial.' It might be mentioned that experiments in ham curing are also in progress at Barbados.

WEST INDIAN FRUIT.

FRUIT FROM COLD STORAGE.

In previous issues of this journal the importance of careful handling and packing of fruit for export has frequently been dwelt upon and suggestions offered as to the best methods which experience has shown should be adopted. *Bulletin No. 123* of the Ontario Agricultural College contains an interesting paper by Professors J. B. Reynolds and H. L. Hutt on the Cold Storage of Fruit. The paper deals mostly with the storage of pears and apples—fruits which are not exported from the West Indian islands; but the facts given are of much interest to residents in these colonies generally, and grocers in particular, especially those relating to the handling of fruit after removal from cold storage, from which we make the following extracts:—

Careful handling after removal from cold storage will lengthen the life of the fruit. In the apple experiment, two basketfuls of sound apples were selected from the same lot for examination. At the time of selection, the apples having been examined in a warm room, they were quite wet, owing to deposition of moisture from the warm air of the room upon the cold apples. They were 'wets,' as they are termed in the old country markets. One basketful of these wets was allowed to remain in the basket as they were. The other basketful was removed from the basket and spread out thinly over the table. The former lot remained wet for some time, the latter dried off quickly. Next day they were removed to the cellar and left there in the same way as described. After ten days they were again examined, with the following results:—

	Sound.	Discoloured.
First lot (left in basket)...	70%	30% (12 % rotten.)
Second lot (spread out thinly) ...	89%	11% (5 % rotten.)

The difference in these two lots was simply one of drying off quickly or remaining wet. It would have been better, of course, if they had not been allowed to become wet at all. To this end the fruit should be warmed gradually, moisture not being allowed to form on its surface; or the warm air should be kept from contact with the fruit, by a covering or an air-tight package, until the fruit has attained the temperature of the surrounding air.

Fruit, on being removed from cold storage, should be allowed to warm gradually, and moisture should not be allowed to deposit upon it. But if the wetting cannot be prevented, then the fruit should be spread out and dried as quickly as possible.

With all kinds of fruit there is a time limit beyond which it is unprofitable to hold the fruit in cold storage, or anywhere else. That limit, for sound fruit, is dead ripeness. Duchess pears can be kept profitably until late in December; Fameuse, or Snow apples, until March or April. The time limit has to be determined for each kind of fruit.

In addition to proper conditions in the storage room, the most important points in the storage of fruit are the *selection* of sound fruit, *grading* into uniform sizes, one variety only in a case, and careful *packing*. Therefore the results of these experiments can be made use of by the family, in preserving fresh fruit for their own use; by the fruit-grower, in securing better prices for good fruit later in the season, in the local markets; and by the shipper, in enabling him to take advantage of the higher prices offered in foreign markets.

THE PACKING OF PINE-APPLES.

The following remarks on the subject of packing pine-apples are taken from a pamphlet entitled *Jamaica Fruit in British Markets,* by Mr. W. B. Gill, published by the Jamaica Agricultural Society, to which reference has often been made in this journal:—

The same remarks apply to condition and appearance of this fruit as have been observed in regard to oranges. Pine-apples should never be packed more than ten or say twelve in one package, and this should be a flat case. The crowns should be left perfectly free and placed so as not to be at all crushed or injured in any way. The handsomer looking crown, the better the price will the pine fetch. Again the maxim comes in, to never mind the increased freight space for the sake of doing away with what is considered by the shipper as worthless. A choice pine is bought as much for decorative purposes on the dinner table as it is for the eating.

Very choice fancy pines should never be placed more than six in a case, say three at each end.

I saw some St. Michael's pines (from which place all the best and finest pines come to England) selling in Liverpool, and by wholesale dealers at 2*s.* 6*d.* and some at 5*s.* each, and selling quite freely at that. This was largely due to their bright, clear, fresh appearance.

I have seen in Jamaica, plenty of pines quite as large and some larger than these same St. Michael's and of tasting qualities unsurpassed, which I have frequently bought in Kingston for 3*d.* or 4½*d.*

I had a small shipment of 180 Jamaica pines put up for sale while in Liverpool, and the highest price fetched was 10*d*. I feel thoroughly satisfied had they been packed as St. Michael's are packed and opened out as fresh and clean (for there were some in shipment quite as large as the above pines I have just quoted as selling at 2*s*. 6*d*. and 3*s*. 6*d*. each), I could have obtained these prices without much difficulty. As it was, the 180 were packed in ten orange boxes, and were not only in consequence crushed, but showed 15 per cent. of 'specked' or started pines, which of course fetch little or nothing.

Very ordinary looking pines retail in most of the cities and towns throughout the kingdom at 1*s*. to 1*s*. 6*d*. They are sound but small; while 'specked' fruit can often be had equally large for 6*d*.

THE SYMINGTON FRUIT SCHEME.

In the last issue we noticed the reception which has been accorded to Mr. Symington's Fruit Scheme in Trinidad, St. Vincent, St. Lucia and Dominica. We omitted at the time to mention that at a special meeting of the Grenada Agricultural Society presided over by his Excellency Sir Robert Llewelyn, K.C.M.G., the following resolution was passed:—

Resolved :—That having heard the outlines of Mr. W. Weldon Symington's scheme for finding an assured market for the fruit grown in this island and for purchasing it for cash on delivery in local depôts, we hereby declare our approval of his scheme and our firm desire to support it in every way. We would further add that the success of any such scheme depends chiefly on inducing the Royal Mail Steam - Packet Company to provide proper carrying accomodation.

In the event of the Imperial Government deciding not to provide the grant of £250 per annum for three years to meet the initiative local expenses, we think it might properly be borne by the Local Government, having regard to the undoubted benefits which will accrue to the island from the establishment of this scheme.

We desire that a copy of this resolution shall be forwarded to the Right Honourable the Secretary of State, the Royal Mail Steamship Company and to Messrs. Thomas Nash & Co., of Plymouth.

WITCH BROOM DISEASE OF CACAO.

This disease of cacao trees was first noted from Surinam in 1898. It receives its name of 'Witch broom' from the curious broom-like appearance of the bunches of mal-formed twigs (Fig. 8) which are its most conspicuous symptom. An examination of the diseased tissues shows the presence of abundant fungus hyphae, but at present it is still uncertain what the fungus is or how it spreads from tree to tree. Professor Ritzema Bos of Amsterdam, to whom specimens were first sent, concluded that the fungus was an *Exoascus*, a close relation of the fungi that cause witch broom formation on birches, cherries, alders, etc., in Europe, but no one has as yet confirmed his result.

The disease has recently again been causing great damage to the cacao trees in Surinam, although it is not actually killing many trees. It is accompanied by hardening of the pods so that many estates are losing the greater part of their produce.

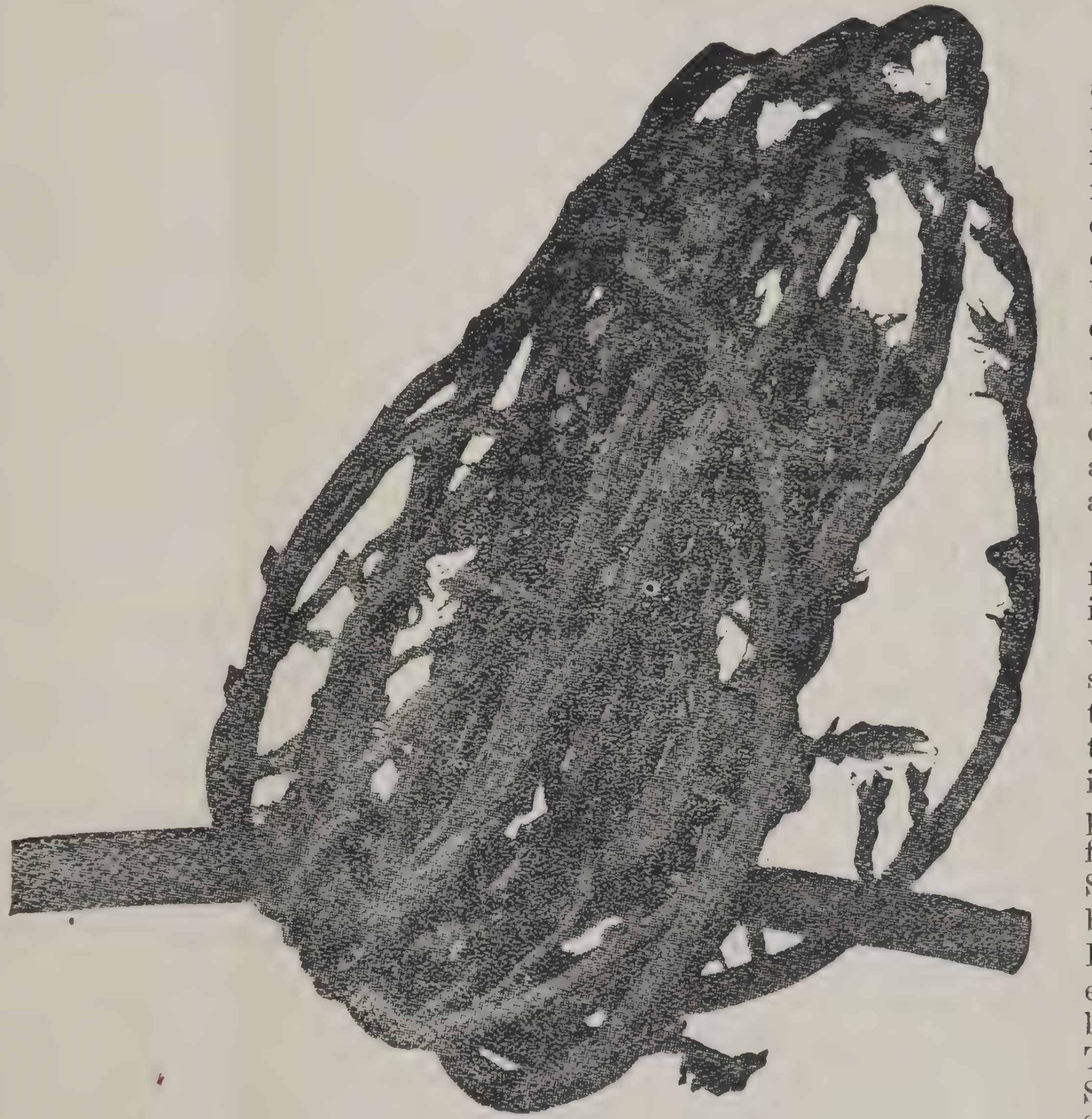

Fig. 8. A 'Witch Broom' on Cacao.

The normal mother branch is seen running horizontally and bearing the tuft of abnormal twigs on which the rudimentary leaves can be distinguished. *(After Professor Ritzema Bos.)*

In the absence of any more definite knowledge of the fungus and of the method by which the disease spreads, the only remedy that can be suggested is the cutting out of the tufted bunches of twigs and of the diseased pods as soon as they are observed and burning them.

In the meantime it is of the utmost importance that the witch broom disease should be kept out of the West Indies; for this purpose the importation of all cacao pods, seeds and plants from the continent of South America should be strictly prohibited. Proclamations to this effect have already been issued at Jamaica, Trinidad and Tobago, St. Vincent, Grenada, St. Lucia and Dominica (see *Agricultural News*, Vol. I, pp. 14, 38 and 100).

For a fuller account of the disease, Volume II, pp. 205-6 and 289-91 of the *West Indian Bulletin* should be consulted.

Cotton Planting in Jamaica. In a previous issue of this journal we stated on the authority of the Jamaica *Daily Telegraph* that Sir Alfred L. Jones had presented the Agricultural Society in that island with 29 tons of cotton seed. Mr. John Barclay, the secretary of the Jamaica Agricultural Society, has written to point out that the gift was one of 29 bags, not as stated of 29 tons.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 96 of this volume.

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Agricultural News

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NOTES AND COMMENTS.

Ensilage versus Haymaking.

It has often been suggested that West Indian agriculturists should adopt the process of converting cane tops and other green fodder into ensilage rather than into hay. This question is discussed by the Hon'ble Francis Watts in an article in Volume III of the *West Indian Bulletin*, entitled 'Additional Notes on West Indian Fodders.' This and similar articles dealing with the care of pastures and the cultivation of useful grasses, will, it is hoped, receive the attention they deserve.

Mr. Watts points out that the object of making ensilage is to prevent a fodder crop being ruined in the attempt to make hay, and that the process is of great value to farmers in rainy districts. In the West Indies, however, there is little risk of the fodder being destroyed by rain, so that it is more economical to preserve fodder in the form of hay than in the form of ensilage.

Mr. Watts therefore concludes 'it is safe to assert that, in a moderately dry tropical country hay-making is preferable to ensilage.'

It is pointed out also in Mr. Watts' article that this opinion agrees with that expressed by Dr. J. A. Voelcker, who has studied the question in India and concludes that there also hay-making is greatly to be preferred to ensilage.

Thrips in Dominica.

Thrips have made their appearance on cacao trees in the Carse-o-Gowrie districts in Dominica. In addition to the remedial measures, reprinted from the *Government Gazette* of Grenada, that appeared in this Journal, (Vol. II, p. 88,) Mr. Branch, the Agricultural Instructor, recommends forking the soil and the application of pen manure to diseased trees. It is important to bear in mind that weak trees are specially liable to be attacked by 'thrips.' Care should, therefore, be taken to keep them in as vigorous a state as possible and attention given to maintaining the soil in good tilth.

West Indian Cotton.

Samples of cotton grown at Anguilla and Barbados were forwarded to the Manchester Chamber of Commerce in January last. The expert to whom they were submitted for examination reports:—

'Anguilla—A. Probably worth 6*d.* to 6¼*d.* on account of staple.
B. About 5⅜*d.* to 6*d.*—very irregular in staple and roughish.
C. Perhaps 5¼*d.* to 5½*d.* but rather poor style of cotton.
Barbados—'Sandy Lane.' Probably worth 6½*d.* on account of superior grade, but not rough enough for Peruvian and too rough for American, therefore probably very slow of sale.'

It is desirable to mention that the above samples were obtained from plants of native cotton found in a half wild condition in the island named. Cotton from selected seed and well cultivated plants would no doubt have obtained much higher prices.

British Honduras.

The newly formed Agricultural and Commercial Society of British Honduras is evidently in earnest. The *Colonial Guardian* of February 21 last, contains a long report of the proceedings of a meeting held on the 17th. of that month with his Excellency the Governor in the chair. At this meeting the St. Louis Exhibition, cotton growing, telegraphic communication with Mexico and other subjects were discussed. At the close the Vice-President (The Hon'ble P. C. Cork) made a statement as follows:—

'In a leading article in a local newspaper it is alleged that I asserted that the best place for a model farm is in the bush 35 miles from Belize. I would point out, in the first place, that I spoke of an "experiment station," and in the second, that it is not my opinion that a model farm should be established in the bush 35 miles from Belize. I would ask those gentlemen who were present and heard me to bear me out that I never said anything so absurd. I may state that I consider an experiment station at the nearest spot from Belize where suitable land can be secured would be useful and that it will be quite possible to find a spot probably on the bank of the Belize or Sibun River within a reasonable distance from the town, but I also think it would be best to make a driving road out of Belize before a site is selected, as the station should be easily accessible to any and every one who wishes to benefit by it, and should be on the line of road or as near to it as practicable.'

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A Substitute for Dishorning.

It is well known that polled or dishorned cattle can be managed and fattened with greater facility than horned animals, and that they can be conveyed by land or sea with less risk of injury.

The process of dishorning cattle is one that inflicts great pain on the animals and may even be the cause of death. In a recent leaflet issued by the British Board of Agriculture, a description is given of a method whereby the growth of horns may be prevented. The operation is said to be comparatively painless and is carried out as follows:—

'Clip the hair from the top of the horn when the calf is from two to five days old. Slightly moisten the end of a stick of caustic potash and rub the tip of each horn firmly with the potash for about a quarter of a minute, or until a slight impression has been made on the centre of the horn. The horns should be treated in this way from two to four times at intervals of five minutes. If during the interval of five minutes after one or more applications, a little blood appears in the centre of the horn, it will then only be necessary to give another very slight rubbing with the potash.'

Caustic potash is poisonous and must therefore be kept in a safe place. It should also be kept in a well stoppered bottle, as it soon deteriorates if left in contact with air.

The operation is best performed when the calf is under five days old, and should not be attempted after the ninth day.

It is better for one man to hold the calf while another uses the caustic. To avoid injury to the operator's fingers the potash stick should be rolled in a piece of brown paper or tinfoil. The stick should not be moistened too much or the caustic may spread to the skin around the horn and destroy the flesh; for the same reason the calf should be kept from getting wet for some days after the operation; also the operator must be careful to rub on the centre of the horn and not round the side of it.

◆

Garden Pests.

The following note on the subject of dealing with diseases of fruit trees in England is taken from the *Pharmaceutical Journal* of March 7, 1903:—

'Amongst the new Bills brought in and read a first time in the House of Commons is one, for which Sir Jas. Rankin is sponsor, to provide for the eradication of disease and of injurious insects amongst fruit trees in nursery gardens.'

Adulteration of Butter.

The subject of the adulteration, or rather, the dilution of butter by the addition of large quantities of water has been attracting public notice in England for some time. The adulteration of butter by inferior fats such as margarine is, of course, already prohibited. We take the following from the *Pharmaceutical Journal* of March 7, 1903:—

'The Minister of Agriculture has brought in his promised Bill to deal with the adulteration of butter. The Bill prohibits absolutely the sale of butter which contains more than 20 per cent. of water, and while it allows butter which contains between 16 to 20 per cent. of water to be sold, it requires that the adulteration shall be declared. Irish firkin butter is excluded from the operation of the Bill, excepting that the limit of 20 per cent. of moisture must not be exceeded.'

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Protection of Birds.

The following remarks appeared in the Barbados *Weekly Recorder* of March 21, in reference to the article in the *Agricultural News* (Vol. II, p. 81) advocating the protection of birds as a safe-guard against insect pests affecting the staple crops of the island. It is a moderate and well-informed statement of the case and we trust that similar views will generally prevail in regard to so important a subject:—

> For many years it has been noticed that the birds of Barbados are rather on the decrease than the increase, and, indeed, it is said by some old livers that several species have disappeared altogether. We cannot exactly say what causes have led to the disappearance of any of our bird species, but we firmly believe that destruction and molestation, influenced by false apprehensions, have had a lot to do with the decrease in the numbers. Six or eight years ago insect pests were numerous among the crops of the island, some of them doing incalculable damage thereto. Just then the attention of the community was directed to the usefulness of birds in keeping under insect pests, and the protection of our birds was advocated in articles written in the press by a stranger who was at the time living amongst us. Protective legislation was strongly recommended as the proper remedy for restoring the balance of nature, and a Bill was brought before the House of Assembly having for its object the protection of the birds of the colony. That measure was debated at considerable length, but so diversified were the opinions entertained by hon. members that after it had been considered in committee it was thrown out by a small majority vote. Whatever motives may have influenced the majority of the House to throw out the Bill, we do not think it can be said that since then the birds of this country have been made to suffer greater molestation than they had to endure in former years. At the same time we regret that there is not already on the statute-book a law protecting birds and making their destruction a punishable offence. It is our hope that the raising of this question again will have the wholesome effect of creating increased sympathy for our birds, many of which are pretty willing to be on friendly terms with us in our homes, if we would but reciprocate their familiarity; and that during the next session of the Legislature a law will be passed for their protection and encouragement as a mark of the increased intelligence of the community.

INSECT NOTES.

Lead Arsenate.

Various forms of arsenic are of great value in agriculture as remedies for caterpillars and other biting insects, and Paris green and London purple have in the past been the chief forms of arsenic used for this purpose. Paris green is an arsenite or aceto-arsenite of copper, generally used as a paint, of a bright-green colour. Commercially it is very frequently adulterated or is improperly manufactured, so that it is either ineffective or dangerous to use. In well made Paris green, all the arsenic is *insoluble in water*, and when sprayed, the arsenic does not dissolve on the leaf and injure it. Soluble arsenic is found in badly prepared Paris green and this injures the plant sprayed.

Paris green has been largely used on account of its insolubility in water, and on account of its efficacy and cheapness; but care should be taken to get a good sample from a reliable firm.

London purple was first introduced as a substitute for Paris green, as it is an insoluble compound of arsenic and lime, produced as a waste product in the manufacture of certain purple dyes. It contains a proportion of these dyes and so has a purple colour, which is of value as an indication of its presence on the plant. London purple is less used than Paris green for many reasons and is being superseded by other compounds.

Recent work in the United States has demonstrated the value of a new compound for spraying—lead arsenate. This is a white substance, insoluble in water and safer in use than either Paris green or London purple for which it is now largely substituted. It can be made by dissolving 6 oz. of sodium arsenate and 18 oz. of lead acetate separately in water and then mixing the two, when a very dense white precipitate is formed of lead arsenate, sodium acetate (a harmless substance) remaining in solution. Made in this way, the white substance is peculiarly suitable for spraying, as it readily remains in suspension and does not at once sink to the bottom of the spraying machine. It has the two great additional advantages of resisting the action of rain when once sprayed on a plant, and of mixing with oil emulsions and other washes without deteriorating them. Lead arsenate has been very carefully tested in Barbados, and can be recommended as a substitute for Paris green. It can be bought in New York, or the materials can be bought and the arsenate prepared as above directed. It can also be prepared from white arsenic, washing soda and lead acetate or nitrate, and directions for this will be sent to anyone who wishes to try it and cannot obtain sodium arsenate.

A new Source of Rubber. Mr. E. deWildeman in the *Comptes Rendus*, 1902, p. 400, describes a new rubber-producing plant from the Congo. *Clitandra arnoldiana* is the name of this species, and the caoutchouc is obtained by boiling the latex or milky juice with water. (*Gardeners' Chronicle*, March 7, 1903).

COTTON.

Notes on Cotton Cultivation in St. Lucia.

Mr. G. S. Hudson, Agricultural Instructor at St. Lucia, has contributed the following article on cotton cultivation in that colony:—

Cotton cultivation in St. Lucia, on a commercial scale, is confined to the district between Choiseul and Laborie of which Revière Dorée is the centre. The cultivation is only three years old and may be said to owe its existence to the Imperial Department of Agriculture, aided by timely grants and bonuses from the St. Lucia Agricultural Society. A roller gin was presented gratis to the district in 1901 by the society on condition that all cotton presented for ginning was cleaned, the ginner (Mr. G. Barnard) retaining 90 per cent. of the seed as his perquisite and to cover working expenses. The gin has hitherto been worked by cattle power, but, a greater speed having been found necessary for efficient work, an air motor is being imported to work it. It is anticipated that the importation of a second gin will soon become necessary. A small baling press capable of turning out bales of about 100 lb. weight was presented by the Imperial Department of Agriculture. The crop of 1902 was purchased and used locally (the selling price being from 3*d.* to 4*d.* per lb. for clean lint) but it is anticipated that a portion of the 1903 crop will be exported.

AREA UNDER CULTIVATION.

The area in cultivation in 1902 was about 50 acres, which was increased to 120 acres in 1903, and there seems every probability of the area increasing at a higher rate than this in succeeding years, now that the St. Lucia peasant has thrown off the distrust with which he habitually regards all schemes propounded for his good. It is a noteworthy fact that this cultivation is, at present, entirely in the hands of peasants. The largest field of cotton in St. Lucia is one of 4 acres on the Experiment Station of the Imperial Department of Agriculture at Revière Dorée. Prizes to the extent of £20 per annum for best cultivations were distributed by the St. Lucia Agricultural Society in 1901 and 1902, and were well competed for. It is now thought that the cotton industry is firmly established at Revière Dorée and similar means should be employed to introduce it into the Micoud district.

VARIETIES OF COTTON GROWN.

'Black, pointed, brittle seed' variety. The present cultivators have hitherto adhered to the native cotton. This may be described as a tall and vigorous bush, bearing black, pointed seed well distributed through the lint, and capable of being easily cleaned by hand. No doubt this characteristic brought it into favour in past times before really serviceable ginning machines were introduced. With a modern roller gin also this variety is easily delinted, but the seeds have a very brittle coat which is apt to get smashed in the gin, and minute particles adhere to the lint, depreciating its value, as they cut the fibre when tightly stretched in the course of manufacture. There is no beard adhering to the seed, and I think it would be convenient to distinguish it by the name of the 'black, pointed, brittle seed' variety. Its value in the Manchester market is 4½*d.* to 4¾*d.* per lb. and it was lately favourably reported on by the Manchester Chamber of Commerce as a kind worthy of cultivation. At the Experiment Station, on poor unmanured land, it yielded 170 lb. of clean lint per acre in 1902, and the estimated yield for 1903 is 230 lb. per acre.

'Kidney,' 'Rat tail,' or 'Chain-seeded' cotton. This

variety was also found existing in native gardens and has been cultivated in a half-acre experiment plot at Revière Dorée. It is hardy and vigorous and gins more easily in a modern machine than any other cotton we have. The seeds are arranged down the middle of the pods in almost a solid block composed of two parallel lines of seed. It is a hardy, tall-growing variety, with a yield almost the same as the 'brittle seed.' It was condemned by the Manchester Chamber of Commerce as not worthy of cultivation in the West Indies.

Another black-seeded, tall-growing variety, somewhat akin in appearance to 'brittle seed,' was recommended to the Experiment Station for trial by peasants as being the kind which used to fetch top prices in the old cotton days. A half-acre patch was planted, but samples submitted to Manchester were most unfavourably reported on. This seed is slightly bearded.

A small, bearded, green seed variety was also under cultivation, and samples of the lint were submitted to Manchester by Mr. George Barnard: they were condemned as unworthy of cultivation.

A large, bearded, green seed variety, on the other hand, evoked a good deal of enthusiasm from the experts at Manchester, who expressed the view that a good sample might fetch from 6½*d.* to 7½*d.* per ℔. It is a fair bearer, and by no means of dwarf habit. Like most good things it possesses a drawback, viz: it is difficult to gin; that is to say, the yield per hour of clean lint from the gin would be about half as much (say 20 ℔. to 25 ℔. per hour) as that of an easily ginned cotton (say 40 ℔. to 45 ℔. per hour) in a Dobson & Barlow Double Action Macartney Gin. This variety will receive an extended trial at the Experiment Station at Revière Dorée in 1903-4.

Puira cotton was imported from Brazil as a variety producing lint equal or superior to Georgia Sea Island for certain uses. It has, however, not come up to expectations, and its cultivation at Revière Dorée is being abandoned.

Georgia Sea Island cotton. After considerable delay, seed of this variety was obtained from Montserrat in August 1902, and was at once planted in a half-acre plot at Revière Dorée. Such late planting does not give a fair trial to the variety, which only promised to yield a small return of, say, 30 ℔. to 40 ℔. per acre. The bushes are small and appear weakly as compared with other varieties growing at the Station, and I am of opinion that the extensive cultivation of this variety should only be recommended to planters after its superiority as a money-producing variety has been tested and confirmed by the Experiment Stations. The Montserrat cotton grown from this seed was valued at 7½*d.* per ℔., and I understand, from Mr. Jordan who grew it, that the yield was small compared with that of other varieties nearly as valuable, and this coincides with my limited experience. In 1903-4 Georgia Sea Island cotton will be given a fair trial at Revière Dorée.

SYSTEM OF CULTIVATION.

Cotton is mostly grown by peasant proprietors and tenants amongst sweet potatos, and, although this is undoubtedly a labour-saving method, it naturally cannot give the best results. The potato banks are made as soon as the rains commence in April or May, and the cotton is planted when the potato vine is well under weigh, on alternate banks. At the Revière Dorée Experiment Station, the ground is forked throughout as soon as the soil is sufficiently soft to allow of it, in the spring, and lined 4ft. by 4ft. for bush varieties, and 4 ft. by 2 ft. for dwarf varieties. The ground is thoroughly drained and a flat system of cultivation generally practised, though experiments are being carried on in ridge culture. About six seeds are planted in each hole and are afterwards thinned out to two to three plants. It is generally found necessary to 'supply' some vacant spots a month or two later. May is, I think, the best month for planting, and planting as late as August will yield a crop, though smaller in proportion to the delay in planting. About four weedings per year will generally be found necessary, say in June, August, October and December, and sometimes a fifth in February, to ensure perfect freedom from weeds. When unoccupied land is being taken up it is advisable to fork it before the dry season and let the sun of March and April thoroughly break up the surface clods: in this process the rains of April or May will assist. Flowers appear in quantities in October and some pickings are available in December, the crop generally continues until March, when the bushes are cut down to within 4 to 6 inches of the ground, burnt to destroy scale blight, and the stumps sprayed with rosin wash. The whole plantation now receives another thorough forking.

An experiment was tried in 1902-3 to demonstrate whether it was more profitable to cut down the bushes at the end of the first year's bearing, or to leave them standing for the second year: the results were favourable to cutting down.

Experiments in manuring with sulphate of ammonia are also in progress and will be reported on later. The effect of an application of 1 cwt. per acre is almost immediately noticeable in improved foliage, but is not lasting unless the application is repeated at intervals of two months.

Cotton has also been used at Revière Dorée as a catch crop in plantations of limes *(Citrus medica*, var. *acida)* and has proved suitable for this purpose, to the extent that the proceeds of the cotton crop cover the expense of planting and cultivating the limes which have made fair growth between the cotton bushes. It is noticed, however, that heavy cotton shade is not beneficial to the lime plants and that they are in some cases affected by scale insects *(Chionaspis minor* and *Lecanium)* from the cotton bushes. The economy effected by this system is beyond doubt, if spraying of lime plants and thinning of excessive shade are practised.

Cotton growing in West Africa.

The *Shipping and Mercantile Gazette and Lloyd's List* for July 12 last, refers as follows to recent experiments in cotton growing in West Africa :—

It is a matter of great satisfaction to Liverpool people that the trial of cotton growing in West Africa has been so successful. A parcel of 26 bales of this description of cotton, which was grown in West Africa from seed supplied by Sir Alfred Jones to the growers, recently arrived in Liverpool, and was sold for 5½*d.* per ℔., a price much in excess of that obtained by middling American cotton. This is proof positive that cotton can be grown advantageously in West Africa, and the industry deserves to be pushed along as much as possible. As an incentive to its production the Lagos and Sierra Leone Railway has offered to carry over its lines all the cotton grown during the next two years, and Messrs. Elder Dempster & Co. have offered to carry up to 1,000 tons free of freight.

Anthrax in Cuba. Mention is made in the *Louisiana Planter* of February 21, of a severe outbreak of the much dreaded Anthrax disease amongst cattle in Cuba. The Cuban Government is taking active steps for suppressing the plague, which it is said can be kept in check by cremating all diseased animals.

POULTRY.

Artificial Incubation.

In places where poultry raising is practised on a large scale it is now generally recognized by those engaged in the industry, that successful results, from a business point of view, can only be obtained by the use of incubators, or hatching and raising chickens by artificial means. Incubators possess several points of advantage over the hen's method of raising her brood, amongst the most important of these being the quantity and quality of the chickens raised by this artificial process. It is claimed that from 70 to 96 per cent of the eggs are usually hatched by means of the incubator and that the chickens are stronger and less subject to disease than those raised by the hen.

Reference has already been made in this journal (Vol. I, p. 266) to the successful efforts of the Rev. G. W. Branch, at Grenada, with an incubator, and it may also be of interest to mention that, in Barbados and elsewhere, several persons are now making trial of artificial incubation. Among the numerous incubators and brooders offered for sale by English and American firms, mention may be made of those manufactured by Messrs. Charles Hearson & Co., Ltd., 235, Regent St., London, W., and the Cyphers Manufacturing Co., Buffalo, New York. The makers of these machines supply full and detailed directions how to work them. It is only necessary to add that these incubators, although styled automatic, are only so to a limited extent, and that unless certain rules are followed and certain conditions in regard to temperature, ventilation and turning the eggs are maintained, the best machines will often fail to hatch satisfactorily.

Fattening in the Tropics.

A planter writing to the *Farm, Field and Fireside* of January last, records the loss between September and December of 1901 and 1902, of some very fine pure-bred Black Orpington cocks, weighing from 8 to 10 ℔. each, which he was fattening for the local market at Dominica. Those fattened in 1901 were fed on Indian corn, and the day previous to their unexpected death the points of the combs were noticed to be dark. They were found dead with their heads twisted under their bodies and one wing extended. A post mortem examination showed a certain amount of fat, and also fat in good quantity at the head of the heart. Their death was therefore ascribed to apoplexy. In 1902 the fattening food was changed to oats and a little milk. Curiously enough, the birds put on no extra flesh, but a post mortem examination showed the same symptoms (fat) as in 1901, but in tremendous quantities.

In view of the foregoing facts the writer desires advice as to the wisest course to pursue to fatten this breed of fowls: also 'how to keep down the fat in the hens so as to bring out their laying qualities, and how often should laying powders be used?'

In reference to the above, Mr. J. Barclay who has contributed very valuable notes on poultry to this journal (Vols. I and II.) advises the crossing of Black Orpingtons with Black Leghorn or Black Minorca cocks for good layers that would not die of fat. His notes on 'Feeding' especially, should be of interest to poultry keepers in the tropics.

EDUCATIONAL.

Leeward Islands.

PROPOSALS TO ESTABLISH SCHOOL GARDENS.

In the *Agricultural News* (Vol. II, p. 90) the proposals of the Department with regard to further courses of lectures to teachers were set forth. We give below the details of a scheme for establishing school gardens in connexion with the elementary schools of the colony. This information formed an enclosure to a letter from the Commissioner of Agriculture for the West Indies to his Excellency the Governor of the Leeward Islands, dated December 10, 1902:—

The following suggestions have been discussed and agreed upon between the Commissioner of Agriculture and the Inspector of Schools for the Leeward Islands. They are for the most part tentative; but it is hoped that a well arranged and co-ordinated scheme for school plots will eventually be evolved.

The Imperial Department of Agriculture is prepared to assist present efforts by allowing school plots when convenient to be started on land attached to the Botanic and Experiment Stations, by the occasional services of the Curators to guide and direct the cultivation on such plots and by contribution of seeds and plants. In country districts, beyond reach of Botanic and Experiment Stations, the services of the travelling Agricultural Instructors could be utilized to advise and assist the teachers and supply seeds and plants.

For the present it is understood that the work on school plots at Botanic Stations, etc., shall be carried out for one hour, or one hour and a half on two afternoons in each week. The day and hour fixed upon by the teachers (under instructions from the Managers or Inspector of Schools), should be communicated beforehand to the Curators and Agricultural Instructors so that they may be present to start and direct operations.

VIRGIN ISLANDS.

School plots for the Anglican and Wesleyan Schools at Tortola could be started at the Experiment Station. The land has already been set apart for this purpose. The Inspector of Schools will, it is hoped, arrange details on the occasion of his next visit to Tortola. The Agricultural Instructor (Mr. Fishlock) will have charge of the plots and direct and assist all operations. At this and all other plots the teachers will be in charge of the boys and be responsible for their conduct and attention to the work in hand.

ST. KITT'S-NEVIS.

The plots already started at the Botanic Station at St. Kitt's (but now in abeyance) will be resumed early next year. They will be under the direction of the Curator (Mr. Lunt) and the operations carried on will follow the scheme to be agreed upon between the Commissioner of Agriculture and the Inspector of Schools after the publication of the new Code and Regulations.

A separate school plot is proposed to be started at Middle Island School under the direction of the Inspector of Schools.

At Nevis two school gardens will probably be started, also under the direction of the Inspector of Schools.

ANTIGUA.

If required, school plots may be started under the direction of Mr. Sands at the Botanic Station or Experiment Plots as found most convenient. A plot has already been selected at Buxton Grove School, another will be started at

St. Mark's and a third at St. Peter's. These latter will be under the direction of the Education Department, but advice and assistance may be rendered, when required, by the Curator of the Botanic Station.

MONTSERRAT.

The plots at the Experiment Stations at Harris' Village and Olveston, already started, will be continued. The Agricultural Instructor (Mr. Jordan) will have entire charge of these and direct and assist the teachers who will carry out his instructions in respect of all cultural operations. It is understood that the latter will attend with their pupils on two afternoons in each week, the day and hour in each case to be communicated beforehand to the Agricultural Instructor by the Inspector of Schools. School plots for each of the three schools in Plymouth are likely to be started on the piece of land now being prepared by the local government for the purpose. The advice and assistance of the Agricultural Instructor may be invited in respect of laying out and cultivating these plots; but he will not, necessarily, have charge of them as in the case of the plots at the Experiment Stations.

DOMINICA.

A plot for the use of the Roseau Boys' School might be provided at the Botanic Station. The Curator would direct the operations and make all necessary arrangements with the Head Master of the School.

In the country districts of Dominica, school plots are likely to be started at about five centres. The exact localities are to be fixed upon later. If the Education Department is wishful for technical assistance in starting and maintaining these plots the travelling Agricultural Instructor (Mr. George Branch) might visit them and advise and direct the teachers and supply seeds and plants. Mr. Branch could record his visits and the results of his observations in the monthly report sent in by him for the information of the Commissioner of Agriculture.

British Guiana.

AGRICULTURAL SCIENCE LECTURES.

The first of the series of lectures on agricultural science to teachers in British Guiana was commenced on the 14th. ultimo at Queen's College, by Mr. E. W. F. English, Science Lecturer, Government Laboratory. Over thirty-two certificated teachers and pupil teachers were present.

In the opening proceedings Professor Harrison mentioned that it was proposed to have two lectures a day, one from eleven to twelve o'clock, and the other from one to two o'clock. He urged the teachers to be regular in their attendance, because each lecture hinged one on the other, and if they missed one, it would be difficult for them to follow the next. At the close of these lectures arrangements would be made for giving them further instruction at the Botanic Gardens. After Mr. English had taken them through the scientific part, he would give them some further lectures.

The subject dealt with on this occasion was 'Measure.' The lecturer explained the metric system of weights and measures which, he considered, was preferable to the English standard. He showed by experiments how the volume of a solid, liquid or gas was to be ascertained, and explained the essential differences between the three bodies.

The next lecture was announced to be delivered on the 21st. ultimo.

OUR BOOK SHELF.
NOTES and REVIEWS.

OUR WESTERN EMPIRE: Published at 1, Lombard Court, London, E.C. Price 6*d.* per number. Annual subscription, post free to West Indies, 8*s.*

This attractive paper is, as its sub-title well describes, 'a monthly magazine devoted to the development of trade between Great Britain and Canada and the West Indies.' The number for February 1903 contains many articles of interest to West Indian traders. A special feature is a long, well illustrated paper on 'Glasgow and Sugar Machinery.' Glasgow is now, as it has always been, the centre of the manufacture of sugar machinery for the West Indies. 'The ancient relation of this port to the West Indies is reflected everywhere in the very names of the streets—Jamaica, St. Vincent, Tobago, etc.'

INDIAN PLANTING AND GARDENING: Published at 5/1, Council House Street, Calcutta. Price 8 annas per number.

This useful periodical has now entered upon its twelfth volume. With this volume the journal has been greatly enlarged, and the Planting Section has been given the premier place, a change which is indicated in the alteration of the title from *Indian Gardening and Planting.* It is now three years since the Section on Planting was introduced into the journal, and it has since grown so largely in importance that the change mentioned above has become a necessity. The Gardening Section has not been altered in any way.

Among the many interesting and important articles that have already appeared in the present volume mention may be made of those on 'Water, Heat, and Air in the Soil,' by Mr. J. E. Aird; 'Improvement of Indian Cotton;' 'The utilization of Cotton Seed;' 'West Indian Sugar cane Experiments,' (from *The Times*); 'Progress in the Sugar Industry,' (from the *Louisiana Planter),* and a 'Report on Para Rubber,' by Mr. Stanley Arden.

We hope that the enterprise of the publishers of *Indian Planting and Gardening* will meet with the success it deserves.

DOMINICA. A FERTILE ISLAND: By F. Sterns-Fadelle. *Printed at the 'Dominican' Office.* Price 1*s.*

This interesting little book aims at putting the natural advantages of Dominica before the outside world with a view to securing help from it in developing the great possibilities of the island.

The author points out that, when the British occupation commenced (1756), coffee was the main product of the island and how this was replaced by sugar; how the fall in the price of sugar caused this to be replaced chiefly by lime and cacao, and how, since then, the prosperity of the island has advanced; still, however, being far behind that of Grenada.

A tribute of thanks is paid to the memory of Dr. Imray, to Dr. Nicholls and to the Imperial Department of Agriculture.

GLEANINGS.

Onion seed sufficient to plant over 100 acres has been ordered for the next planting season in the West Indies.

The St. Lucia Agricultural Society has recently imported 12 bushels of selected Sea Island cotton seed from America. The seed is being retailed to planters in that colony at 3*d.* per lb.

Owing to a severe drought in the banana districts at Jamaica and to a consequent scarcity of the fruit, it is stated that the steamers of the Elder Fyffe Co., Ltd., have been compelled to temporarily suspend operations in that island and to obtain fruit from Costa Rica.

The output of rum from Demerara, according to the export returns from January 1 to March 20, 1903, shows a falling off, compared with the exports for the corresponding period of 1902, of 237,789 gallons. On the other hand, some new items appear. Amongst these may be mentioned rice 9,626 lb., and molascuit 83½ tons.

Ground nuts are at present quoted as being worth in the Liverpool market £15 15*s.* per ton, and castor oil seed 8*s.* 6*d.* per cwt.

The refuse or 'trash' of the cassava starch factories in Florida is regarded as a valuable feed for dairy cattle. The analysis of this by-product shows 50 per cent. carbohydrate, 2 per cent. protein and 40 per cent. digestible fibre. Four parts of this refuse mixed with two parts of crushed corn, or one part of cocoa-nut meal, is recommended as a good ration for cows, mules and horses.

Mr. S. T. Dunn, from the Herbarium staff of the Royal Gardens, Kew, has been appointed to the post of Director of the Botanic Gardens, Hong Kong, in succession to Mr. Ford.

According to a recent report of the British Consul at Amsterdam, 48,000 bales of kapok were imported into Holland during 1901. Kapok, it may be mentioned, is the downy substance from the seed pods of the well-known 'Silk Cotton' trees of the West Indies. This fibre is considered well adapted to upholstering purposes where its elasticity and coolness commend its use for pillows, cushions, etc. The commercial supply at present is chiefly derived from Java and the East. The present quotations for kapok are as follows:—Superior cleaned 7⅕*d.* to 7⅗*d.* per lb.; good 5⅘*d.* to 7⅕*d.* per lb.

A disease of lime trees is causing anxiety at Dominica. The services of the Entomologist of the Imperial Department of Agriculture have been applied for.

An interesting analysis of molascuit, made from vacuum pan molasses, by Professor John Hunter, F.I.C., F.C.S., appears in a recent issue of the *West India Committee's Circular*. The analysis is regarded as highly satisfactory and affords testimony to the qualities of this product as a cattle food. Professor Hunter states: 'This is an excellent example of feeding stuffs of its class. If judiciously used it will be found a highly advantageous addition to the ordinary feeding stuffs of the farm.'

Mr. J. Burtt Davy, F.L.S., formerly of the Royal Gardens, Kew, and lately assistant to the Professor of Botany at the University of California, has been appointed Botanist to the Department of Agriculture at Pretoria in the Transvaal Colony.

Sir Martin Conway in his recently published book *Aconagua and Tierrá del Fuego* says, that for men taking violent exercises, such as soldiers on active service or athletes in training, a plentiful supply of sugar is better than large meat rations. In particular he refers to the value of West Indian brown sugar.

According to the *Colonial Guardian*, British Honduras, *bimarina* is the dried banana reduced to flour, and *bivinagre* is the splendid vinegar made from the ripe fruit. In appearance it resembles old port, improves with age, and once tasted kills the appreciation for every other description of vinegar.

A correspondent writes with reference to the publications of this Department as follows:—

'These publications are getting to be more valued day by day. Not only are the different subjects thoroughly dealt with, but they are so plainly put, with such complete explanations, that the simplest mind can take them in. I do not know what the West Indian islands would do if they were to be discontinued; the wonder is how have we managed to do without them hitherto.'

The *Hand-book of Jamaica* for 1903 has just been received. This was first issued in 1881. It is a valuable West Indian publication.

Samples of cassava starch have been sent to England from Jamaica. It is considered that this product may be useful in the brewing of beer. Commercially, cassava starch is unknown in the European market. The value of the starch in Europe (pronounced by United States officers of the Department of Agriculture to be superior to potato starch) cannot be less than £12 per ton in quantity. A London firm could do with from 50 to 100 tons per month. Unfortunately, however, the area of cassava under culture in the island is quite insignificant, i.e., small patches widely dispersed. It was impossible even to secure 15 tons of starch for shipment. Further there is no machinery in Jamaica for manufacturing starch. The foregoing will show that there is evidently a future for this product if it were cultivated extensively. (*Our Western Empire*, March 15, 1903).

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

Mr. John R. Jackson, A.L.S., formerly keeper of the Museums at the Royal Botanic Gardens, Kew, has contributed the following notes in continuation of his articles in the *Agricultural News*, Vol. II., pp. 21, 25 and 52 :—

In reviewing the drug and spice markets during the month of February, the report of the first week in the month was that a decided improvement was apparent in the demands both for new and old drugs. At the end of the month, however, the general tone of business was described as 'by no means brisk.'

SARSAPARILLA.

The fluctuations in the prices of individual drugs did not affect those of West Indian produce. The following items may nevertheless be worth recording: at the first auction in February there was a plentiful supply of Jamaica sarsaparilla, as well as a good demand at steady prices ranging from 1*s.* 2*d.* to 1*s.* 3*d.* per ℔. for sound quality, and 1*s.* to 1*s.* 2*d.* for country and sea damaged. Fair to good bright red sold at from 11½*d.* to 1*s.* 3*d.*, and greyish damaged at 10*d.* A fortnight later forty-eight packages of Lima-Jamaica were offered, which were sold after competition at from 1*s.* to 1*s.* 1*d.* per ℔, while Honduras was quoted at 1*s.* 4*d.* to 1*s.* 5*d.* spot. At the end of the month a fresh arrival was announced of 20 bales Lima-Jamaica, 4 bales of red native and 19 bales of grey Jamaica.

GINGER.

With regard to ginger, the quotations at the sale on February 4, stood thus—Cochin, small rough, 33*s.* per cwt.; good washed rough was bought in at 42*s.* to 45*s.*; unassorted native cut realized 55*s.*, medium and small 60*s.*, and bold 80*s.* per cwt., while the prices of Jamaica were 37*s.* to 37*s.* 6*d.* for ordinary dull and lean, and 41*s.* for middling washed. At the sale on the 11th. of the month the first arrival of the new crop of Cochin was offered, but there was very little demand for it and it was bought in at 40*s.* per cwt. for washed rough, while one lot of bold rough sold at 40*s.* per cwt. Calicut bold cut was bought in at 90*s.*, and medium and small at 54*s.* At the same sale Jamaica partly sold at 36*s.* 6*d.* to 38*s.* for small dark lean and ordinary dull, the better qualities being bought in. The quantities put on the market at this sale were—Cochin 580 packages, Jamaica 95 barrels. At the last sale in the month there was very little demand for this article and the prices stood with very little change from the previous sale, which gave bold native cut Cochin at 75*s.*, and small at 48*s.*, while Jamaica was partly sold at 38*s.* 6*d.* to 39*s.* for dull dark, and 40*s.* 6*d.* to 42*s.* 6*d.* for dull washed. A parcel of Japan was withdrawn without a price being mentioned, but it was said to have been sold privately at 30*s.* per cwt.

ALOES.

Of aloes the following are the statements for the four weeks:—At the beginning of the month there was a good general demand, Cape aloes being lower, in consequence of their more abundant supply. For this kind, good seconds, 38*s.* to 38*s.* 6*d.* was realized, while fair seconds fetched 33*s.*, and 21*s.* 6*d.* to 24*s.* was obtained for mixed reddish and streaked with liver. Another lot of Cape consisting of 50 cases was firmly held; for fine bright hard 40*s.* was refused, and 35*s.* to 36*s.* was accepted for ten cases dull and drossy. Good hard Socotrine in kegs sold at 72*s.* 6*d.*; Zanzibar in skins at 43*s.* for hard hepatic, and 40*s.* for softish, slightly drossy. At the sale on the 19th. the following were the prices quoted and paid, the drug being in good demand:— 38 boxes of Curaçoa sold at 22*s.* per cwt. for good liver, slightly coarse, 18*s.* for fair quality, and 15*s.* 6*d.* to 16*s.* 6*d.* for mixed and dull livery. 21 cases of Zanzibar sold at 65*s.* for good hard hepatic, 30*s.* being realized for hard drossy and mixed. It may be of interest to note that the exports from Cape Colony during the past year show a considerable falling off in quantity from those of the previous year. In 1901 aloes were exported to the extent of 368,503 ℔. of the value of £1,955, while in 1902 the exports had dropped to 300,757 ℔., with the increased value of £2,040.

It will be observed that no quotations of Barbados aloes have occurred during the month.

ARROWROOT, MUSK SEED, OIL OF LIME, ETC.

The other items of the month were—St. Vincent arrowroot, slow of sale, realized from 1½*d.* to 1¾*d.* per ℔. for common, and 2⅛*d.* to 2½*d.* for fair to good; Musk seed, fair West Indian, 1*s.* 4*d.* per ℔.; Oil of lime, West Indian distilled, 1*s.* 2*d.* to 1*s.* 3*d.* per ℔.; Cassia fistula, fair pods, 37*s.*; Tamarinds, fair squashy, Antigua, which have been scarce, were taken out at 16*s.*; Kola nuts, which are said to be scarce, especially African, were quoted at 5½*d.* for bold West Indian, while papain was reported as obtainable at 30*s.* per ℔. net.

INQUIRIES.

Destruction of Weeds.

A correspondent writes asking for information as to a chemical that will kill 'the weeds and high grass which so rapidly grow in coffee estates, without damage to the coffee plant.' It is, he says, 'so far a question of manual labour and thereby heavy expense.'

We shall be glad of any information on this subject from our readers. In England and France numerous experiments have been made with the object of destroying charlock in corn fields. The chemicals tried in England have been chiefly sulphate of copper (blue stone) and sulphate of iron (green vitriol); the latter has proved of very little use, but the copper salt has been moderately successful, the best results having been obtained by spraying 50 gallons of a 3 per cent. solution per acre. Nitrate of soda has been tried in France, the best results being obtained with a 20 per cent. solution applied at the rate of 100 gallons per acre. The results are said to be very satisfactory so far as the destruction of charlock is concerned. Further information on this subject will be found in Volume III of the *Journal of the Board of Agriculture.*

It is probable that these chemicals will only prove of service with weeds which, like the charlock, do not possess a perennial underground root or rhizome.

The Threshing of Pigeon Peas.

A correspondent from Anguilla writes to ask for information as to a machine which could be used for threshing pigeon peas. He states that 'the present method of dealing with the peas is to beat the pods with poles, and this means expense which might be avoided by the use of suitable machinery.' We should be glad of information on this subject from any of our readers.

SELECTION OF CORN FOR PROTEIN.

The following extract from Professor Hopkins' paper will serve to explain some of the points discussed in the article on 'Corn Breeding' on pages 113-4:—

The method of making a chemical selection of ears of seed corn by a simple mechanical examination of the kernels is based upon the fact that the kernel of corn is not homogeneous in structure, but consists of several distinct and readily observable parts of markedly different chemical composition. (See illustrations.) Aside from the hull which surrounds the kernel, there are three principal parts in a grain of corn:—

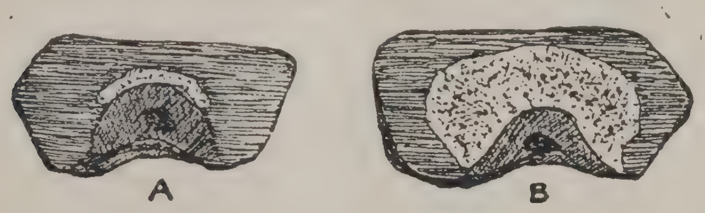

Fig. 9. Corn Kernels in Cross Section.
A. High-protein, kernel, little starch.
B. Low-protein, kernel, much starch.
(After the author's illustrations.)

(1) The darker coloured and rather hard and horny layer lying next to the hull, principally in the edges and toward the tip end of the kernel, where it is about 3 millimeters, or ⅛ of an inch, in thickness.

(2) The white starchy-appearing part occupying the crown end of the kernel and usually also immediately surrounding, or partially surrounding, the germ.

(3) The germ itself which occupies the central part of the kernel towards the tip end.

These different parts of the corn kernel can be readily recognized by merely dissecting a single kernel with a pocket knife, and it may be added that this is the only instrument needed by anybody in making a chemical selection of seed corn by mechanical examination.

The horny layer which usually constitutes about 65 per cent. of the corn kernel contains a large proportion of the total protein in the kernel.

The white, starchy part constitutes about 20 per cent. of the whole kernel, and contains a small proportion of the total protein. The germ constitutes only about 10 per cent. of the corn kernel, but, while it is rich in protein, it also contains more than 85 per cent. of the total oil content of the whole kernel, the remainder of the oil being distributed in all of the other parts.

By keeping in mind that the horny layer is large in proportion and also quite rich in protein and that the germ, although rather small in proportion is very rich in protein, so that these two parts contain a very large proportion of the total protein in the corn kernel, it will be readily seen that by selecting ears whose kernels contain more than the average proportion of germ and horny layer, we are really selecting ears which are above the average in their protein content. As a matter of fact, the method is even more simple than this, because the white starchy part is approximately the complement of, and varies inversely as, the sum of the other constituents; and to pick out seed corn of high protein content, it is only necessary to select those ears whose kernels show a relatively small proportion of the white starchy part surrounding the germ.

It should be emphasized that it is not the absolute, but proportionate, size or quantity of germ or of white starch which serves as a guide in making these selections.

DEPARTMENT NEWS.

Mr. Henry Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, has lately visited St. Kitt's and Antigua and carried out interesting observations in connexion with insect pests affecting the staple crops of those islands. At present Mr. Ballou is at Dominica devoting his attention to the diseases of lime trees.

The first part of Volume iv of the *West Indian Bulletin* is now in the press and will be issued very shortly. It contains 'Notes on Diseases of Logwood, Cocoa-nuts, etc. at Jamaica,' and a valuable paper by Dr. G. C. Hopkins on 'Corn Breeding.' The titles of other papers are 'Recent work on Vegetable Ferments', 'Cotton growing in the West Indies', 'Cotton seed Industry of the United States of America', 'Root Borer of Sugar-cane' by the Revd. N. B. Watson, 'Disease-Resistant Plants,' 'Sugar-cane Experiments at British Guiana,' 'Hybridization of the Sugar-cane' 'Gambier in the West Indies', 'Agricultural Progress at Bermuda' and 'Volcanic Dust at Barbados'.

The latest addition to the Pamphlet series of the Department is entitled *Notes on Poultry Keeping in the West Indies.* It contains, gathered together in convenient form, the articles which have appeared recently in the *Agricultural News,* after careful revision by the author, Mr. J. Barclay of the Jamaica Agricultural Society.

CANADIAN EXHIBITIONS 1903.

Messrs. Pickford & Black have been good enough to communicate the following information in respect of the Industrial and Agricultural Exhibitions to be held in the Dominion of Canada during the autumn of 1903:—

Toronto Exhibition will open August 31, close September 17.

Halifax Exhibition will open September 9, close September 17.

Ottawa Exhibition will open September 11, close September 19.

Messrs. Pickford & Black state that no Exhibition will be held at St. John, New Brunswick during 1903.

The Sleeping Sickness. A paragraph recently appeared in the daily press that a Dr. Hans Ziemann had been making investigations into the cause of 'sleeping sickness,' and had arrived at the conclusion that it was due to chronic intoxication with a poisonous material ingested with food, and that Manioc or Cassava is the food which fulfils these conditions. It is further said that 'the author, in support of his belief, that this disease is an intoxication, and not due to a specific organism, gives it as a fact that in the blood of persons suffering from sleeping sickness there is no exciter of disease that can be cultured by the usual methods so as to be made to develop further.' (*Gardeners' Chronicle*, February 21, 1903).

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—March 17, 1903.—Messrs. A. E. De Pass & Co., Messrs. Kearton Piper & Co., 'The Gardeners' Chronicle,' March 14, 1903, and 'The Public Ledger,' 1903.

Aloes—Curaçoa, 14/6 to 40/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, $1\frac{1}{2}$*d*. to 3*d*. per lb.
Balata—Surinam Sheet, 2/2 to 2/5 per lb.
Bees-wax—£8 10*s*. per cwt.
Cacao—T'dad, 58/- to 68/- per cwt. ; Jamaica, 50/- to 56/- per cwt. ; Grenada, 51/- to 58/- per cwt. ; Dominica, 50/- to 56/- per cwt.
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 29/6 to 64/- per cwt.
Cotton—West Indian, $5\frac{1}{2}$*d*. to $5\frac{7}{8}$*d*. per lb.
Fruit—
- Bananas—8/- to 12/- per bunch.
- Oranges—9/- to 14/- per case.
- Pines—2/- to 4/- each.

Fustic—£4 10*s*. to £4 15*s*. per ton. (Prices unchanged.)
Ginger—36/6 to 46/- per cwt.
Honey—Jamaica, 17/6 to 21/- per cwt.
Isinglass—West Indian, 1/2 to 2/9 per lb.
Kola Nuts—1*d*. to 4*d*. per lb.
Lime Juice—Raw, 9*d*. to 1/- per gallon. Concentrated, £14 per pipe.
Logwood—£4 2*s*. 6*d*. to £4 5*s*. 0*d*. per ton.
Mace—1/7 to 2/2 per lb.
Nitrate of Soda—Agricultural, £9 5*s*. per ton.
Nutmegs—70's to 64's, 1/9 to 2/4, 93's to 89's, 1/1 to 1/2.
Pimento—$2\frac{3}{16}$*d*. to $2\frac{1}{2}$*d*. per lb.
Rum—Demerara, 8*d*. to 10*d*. per proof gallon. Jamaica, 1/6 to 7/- per proof gallon.
Sugar—Muscovado, 10/3 to 12/6. Crystallized, 14/3 to 16/3 per cwt.
Sulphate of Ammonia—£12 10*s*. 0*d*. per ton.
Tortoise Shell—14/- to 24/6 per lb. Yellow belly, 50/- to 55/- per lb.

Halifax, N.S.,—The Maritime Merchant, March 12, 1903.

Molasses—Barbados, 25c. to 26c. per gallon.
Oranges—Jamaica, $6.00 per barrel, $3.00 to $3.50 per box.

New York,—March 20, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, $1.00 to $1.10 ; eight hands, 80c. to 85c. per bunch.
Cacao—African, $11\frac{1}{2}$c. to $12\frac{1}{2}$c. ; Caracas, $13\frac{1}{2}$c. to $16\frac{1}{2}$c. ; Jamaica, $10\frac{3}{4}$c. to $11\frac{1}{2}$c. ; Grenada, $11\frac{1}{4}$c. to 12c. ; Trinidad, 12c. to $13\frac{1}{4}$c. per lb.
Cocoa-nuts—Trinidads, $8.00 to $15.00 ; Jamaicas, $17.00 to $18.00 per M.
Coffee—Rio, good ordinary $5\frac{5}{8}$c. ; Jamaica, fair to good ordinary 6c. to 7c. per lb. ; Manchester grades $8\frac{1}{2}$c. to $10\frac{1}{2}$c. per lb.
Ginger—Jamaica, $6\frac{3}{4}$ to 8c. per lb.
Pimento—$4\frac{1}{8}$c. to $4\frac{1}{4}$c. per lb.
Rubber—Nicaragua scrap, 65c. to 67c. per lb. Guayaquil strip. 59c. to 60c.
Sugar—Muscovado, 89°, $3\frac{5}{16}$c. per lb.; Centrifugals, 96°, $3\frac{11}{16}$c. ; Molasses, 89°, 3c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—March 24, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—16c per gallon, package included.
Sugar—$1.45 per 100 lb.

Barbados,—March 28, 1903.—Messrs. James A. Lynch & Co., and Messrs. T. S. Garraway & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb.
Cacao—Dominica, $12.50 per 100 lb.
Coffee—Jamaica, $8.00 to $9.00 per 100 lb.
Hay—New Brunswick, 85c per 100 lb.
Manures—Nitrate of Soda $60.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $80.00 ; Sulphate of Potash $67.00 per ton.
Molasses—16c. per gallon, and $4.00 for puncheon.
Onions—Madeira, $3.00 per 100 lb.
Potatos, English—$2.05 per 100 lb.
Rice—Ballam, $4.25 per bag (190 lb.) ; Patna, $3.50 per 100 lb. ; Rangoon, $2.75 per 100 lb.
Sugar—In hogsheads $1.35 per 100 lb., and $5.00 for hhd. In bags $1.60 per 100 lb.

British Guiana,—March 25, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8.50 per barrel.
Cacao—native 11c. to 12c. per lb.
Cassava Starch—$7.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11c. to 12c. per lb. (retail.) —Creole, 11c. to 12c. per lb.
Dhal,—$3.80 to $3.90 per bag of 168 lb.
Eddoes—$1.44 per barrel.
Molasses—Vacuum Pan, yellow, 16c. per gallon, casks included.
Onions—$4\frac{1}{2}$c. to 5c. ; Garlic 7c. to 8c. per lb.
Pea Nuts—Curaçoa, $3\frac{3}{4}$c. ; American, 5c. per lb. (retail).
Plantains—24c. to 60c. per bunch.
Potatos, English—$3.00 to $4.00 per barrel.
Rice—Ballam, $4.75 ex store ; Patna and Seeta, $5.75 to $5.90 per bag.
Creole Rice, 18c. to 19c. per gallon (retail).
Sweet Potatos—Barbados, $1.68 per barrel.
Tannias—$1.68 per bag.
Yams—$2.00 per bag.
Sugar—Dark Crystals, $1.95 to $2.00 ; Yellow, $2.50 to $2.60 ; Molasses, $1.90 to $2.00 per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—Messrs. Edgar Tripp & Co., March 26, and Messrs. Gordon Grant & Co., March 26, 1903.

Balata—40c. to 41c. per lb.
Cacao—Ordinary, $12.25 to $12.50 ; Estates, $12.75 to $13.25 per fanega.
Coffee—6c. per lb.
Molasses—Bright Muscovado, 14c. to 15c. per gallon, f.o.b.—(casks extra).
Onions—$3.66 per 100 lb.
Potatos, English—$1.25 to $1.60 per 100 lb.
Rice—Yellow, $4.40 ; White Table, $5.75 to $6.50 per bag.
Sugar—Yellow Crystals for local consumption, $2.25 to $2.40 per 100 lb.
—Molasses sugar $1.75 to $2.00 per 100 lb.

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AGRICULTURAL
NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Onion Industry.

THE cultivation of onions, on a commercial scale, was started at Antigua in 1896 through the exertions of Mr. Smith (formerly a Bermudian planter) and Mr. A. G. Tillson, then Curator of the Botanic Station. Mr. Tillson read a paper before the Agricultural Society in November 1895, and pointed out the best methods of cultivation and the steps necessary to develop a trade in onions with the United States of America. Since that time it has been shown that Antigua could grow onions in every way equal to those produced in temperate countries. It was estimated that in 1900-01 about seventy acres were under cultivation in that island.

At Montserrat very energetic efforts have been made to introduce the cultivation of onions as a regular industry by Mr. F. H. Watkins the Commissioner. A pamphlet (No. 16) containing simple and practical hints for carrying on and establishing a successful industry has been prepared by Mr. Watkins and published by the Imperial Department of Agriculture.

Similar efforts have been made by Mr. H. Hesketh Bell, the Administrator of Dominica, and the subject was prominently brought by him before the members of the Agricultural Society. The experiments at Dominica have included raising onions from sets as well as from seed, and the results have been very encouraging. In 1902 twelve crates shipped on February 28, realized $2.50 per crate, and five crates shipped on March 11, realized $2.40 per crate. The brokers reported that the quality of the onions was good and that they could 'at all times compete with Bermudas or Cubas.'

At St. Lucia, where considerable quantities of onions are imported for the troops, it has been shown that better and finer onions can be grown locally, and it is probable that, with the co-operation of the Imperial Department of Agriculture and the Agricultural Society, a considerable area will be planted with onions during 1903.

Experiments in onion growing with the aid of the Imperial Department of Agriculture are also being carried on at Barbados, St. Vincent, Grenada and Tobago. At present the Department has undertaken to supply the best Canary Islands onion seed sufficient to plant over 100 acres.

In the sugar islands it is possible to plant out onion seedlings, say in November, on the banks of the sugar-canes. Thus no expense is incurred in the preparation of the soil, and the onions are ripe and can be removed before the canes are large enough to cover the land. This is an important point to bear in mind in connexion with growing onions in the West Indies, and, given moderately favourable seasons, there is no reason to doubt but that the crop will prove a most useful subsidiary to the sugar industry.

The value of the total imports of foreign onions into all parts of the West Indies cannot be less than about £15,000 per annum. Taking one colony only, we find that the value of onions imported into Trinidad during five years was as follows: 1895, £7,537; 1896, £4,905; 1897, £10,583; 1898, £7,857; 1899, £10,431. The total value of the import of onions into Trinidad for five years (1895 to 1899, inclusive) was £41,313.

The cultivation of onions at Barbados was started last year. The experiments were, necessarily, on a small scale, but the results have, on the whole, been so encouraging that it is anticipated that during the current year about fifty acres will be planted with onions.

At a special meeting of the Agricultural Society held at Bridgetown on April 9, a report was presented by the committee appointed to co-operate with the Imperial Department of Agriculture in connexion with the onion industry. The report is as follows:—

'In reference to the prospect of onion cultivation, your committee have the honour to report that 174℔. of Canary Islands seed have been ordered by planters in this island, and it is probable that about fifty acres will be placed under cultivation during the present year. With moderate success, this area might yield about 150,000℔. of onions, or 3,000 crates of 50℔. each.

'It is hoped that the seed will arrive in August, and it is recommended that the seed beds be carefully prepared beforehand. In regard to the selection of the site for seed beds (preferably close to a water supply) and the preparation of the land, information may be obtained on application to Mr. J. R. Bovell, the Superintendent of the Botanic Station.

'The essential point in the success of an onion industry with the United States is that the crop of onions, well cured and carefully packed, should be ready for shipment not later than the middle or end of January, so as to reach New York before the Bermudian and Cuban crops.

'Suitable crates, to hold 50℔. of onions each, are obtainable (preferably in shooks for the United States) at a moderate cost. Crates made locally or obtained from any other country, are liable to duty on entry into the United States.

'We are informed by the Imperial Department of Agriculture that it is in contemplation to appoint an agent at New York to look after the interests of shippers of onions from the West Indies, and to supply information in respect of the market, weekly, from January 1 next.

'In view of the fact that the onion industry in Barbados has passed its experimental stage and assumed encouraging proportions, your committee is of opinion that a duty might properly be imposed on onions imported into this island.'

SUGAR INDUSTRY.

Sugar-cane Experiments in British Guiana.

The following extracts are taken from the Progress Report on Sugar-cane Experiments in British Guiana for the half-year ending December 1902, by Professor J. B. Harrison, C.M.G., M.A., F.I.C., F.C.S., F.G.S., Government Analyst and Deputy Chairman of the Board of Agriculture:—

During the period under review, the sugar-cane experiments have been carried on under my control, assisted by the advice of members of the Sugar-cane Experiments Committee of the Board of Agriculture. In November, the experiments were directed during my absence in the interior of the colony by Mr. B. Gainfort, Acting-Superintendent of the Botanic Gardens. The actual conduct of the agricultural work has devolved upon Mr. Ward, the Agricultural Assistant in charge of sugar-cane experiments. Mr. Ward, however, was, during the months of October and November, incapacitated by ill health, and Mr. Beckett, Assistant Instructor in Agriculture, was in charge of the field work.

During the month of July the portion of the manurial field hitherto occupied by Bourbon canes under experiment with various forms of phosphates and of potash salts was replanted with White Transparent, and with Nos. 625, 115 and 109 varieties. These kinds of canes will be examined for their varying demands for nitrogen, and the effects, if any, of manurings with phosphatic manures upon their yields. Much difficulty has been experienced in obtaining a satisfactory spring of No. 625. We have noticed this defect on previous occasions and it appears to us that tops for planting No. 625 should be obtained from canes of somewhat older growth than is desirable when replanting Bourbon canes from drawn-down stools. The canes on the other fields received appropriate agricultural treatment.

The following are the varieties cut on the North field, the average weight of canes per acre yielded by each of them, and the indicated saccharose contained in the juices expressed from them by a Laboratory mill:—

Nos. of canes.	*Tons of canes per acre.*	*Pounds of saccharose per gallon in the normal juice.*
625	82·8	1·769
116	76·3	1·747
130	75·7	1·699
145	70·8	1·814
78	68·1	1·640
115	66·7	1·710
109	65·9	1·758
3,956	62·1	1·713
74	59·16	1·800
95	59·1	2·077

The mean return on this field was at the rate of 78·8 tons of cane per acre, if the actual area occupied by the cane rows and drains is alone taken into account; or at the rate of 69·2 tons per acre on the total area occupied by cane rows, divisional spaces and drains. The causes of this high rate of yield are that the land is practically virgin land not having been, as far as is known, used previously for cane cultivation; that, after being cleared from the dense bush which had covered it, it was taken over by a very active growth of native leguminous plants, and was occupied by this for several months; that it is of a somewhat lighter character than is usual in the neighbourhood of Georgetown; that it received thorough tillage; that its drainage facilities during the time the canes were on land were fairly satisfactory; and that the canes were subject to an unintentional irrigation caused by leaks in the large trench north of the field allowing water to constantly find its way through the small drains. Under these conditions Nos. 74, 78, 115, 116, 130, and 625 responded in varying degrees to applications of sulphate of ammonia, while Nos. 95, 109, 145 and 3,956 were not favourably affected. Applications of slag-phosphates were not attended with favourable results in this crop of plant canes.

The following shows, arranged in order of their yields of indicated sugar, the rates of yields of canes per acre, and the saccharose-contents of the expressed juice of the varieties of canes, which were reaped as second ratoons on the Brickdam field:—

Nos. of canes.	*Tons of canes per acre.*	*Pounds of saccharose per gallon in the normal juice.*	*Indicated sugar, Bourbon as 100.*
115	35·9	1·816	137·8
130	34·9	1·920	135·8
2,468	36·5	1·842	134·2
625	40·5	1·645	131·5
1,087	43·7	1·437	131·5
147 B.	42·1	1·572	130·4
3,157	30·3	1·874	124·1
1,640	30·5	1·608	124·0
132	34·2	1·759	122·9
74	30·7	1·796	119·4
2,028	32·1	1·822	117·0
1,880	30·7	1·998	116·4
109	35·7	1·645	116·2
145	31·6	1·900	115·5
102	26·5	2·071	115·1
White Transparent (1st ratoons)	26·5	1·892	103·1
Bourbon (1st ratoons)	28·1	1·775	100·0
2,190	27·5	1·744	100·0

Central Factory at Antigua.

In continuation of the information published in the *Agricultural News*, (Vol. II, p. 99), the following remarks addressed by Sir Gerald Strickland, K.C.M.G., to the owners of sugar estates and others, at Government House, Antigua, on April 2, are quoted from the *Antigua Standard* of April 4:—

(1) I have invited the gentlemen interested in the Sugar Industry to meet me again in connexion with the new factory scheme to thank those who have assisted in submitting proposals for the consideration of the Secretary of State, and to impress upon tenderers that the most stringent guarantees for the fulfilment of the public objects of the concession are necessary to support my efforts in obtaining this grant on the most favourable terms.

(2) As I have already pointed out the public objects of the proposed grant are the establishment of a modern factory with the greatest possible capacity for the least cost and under conditions carefully calculated to ensure success, in the hope that other similar factories will rapidly follow, and that the prosperity of Antigua will thus be re-established.

(3) But it is essential, in order that the public objects of the grant may accrue for the benefit of a large section of the community rather than of an individual firm, that the peasants and tenant farmers should receive direct advantages from the proposed Imperial Grant.

(4) The greatest attention is therefore necessary on the part of those who are likely to control a central factory, in considering further how they can co-operate with the largest possible number of peasants and cane farmers.

(5) I also venture to appeal to large and small capitalists in Antigua to come forward and support, to the best of their ability, the financing of this colonial enterprise in order that the profits to be derived from the soil of this island may, as far as possible, remain at home.

(6) The owners interested in the schemes under consideration should at once appoint an agent in England and legally invest him with full powers to act for them, and, if necessary, to mortgage their estates.

(7) In order to facilitate a decision by the Colonial Office I have decided to send Mr. Watts to England by the next mail, notwithstanding the difficulties of the temporary loss of his technical advice and valuable services.

(8) It will assist me if, before the end of this week, duplicate copies of tenders received and of plans of estates concerned are placed at my disposal.

(9) These remarks have been restricted to considerations of a general character, inasmuch as the tenders are confidential, but if the tenderers would like further confidential discussions as to the guarantees which the Government may require, I would be ready after this meeting to see one or two representatives of each group, provided that they are prepared for such debate as is advisable in the presence of each other.

(10) The enterprise shown by those who have come forward and facilitated the further submission of this question for the consideration of the Secretary of State, makes me confident that a new era of prosperity is dawning for Antigua. I beg to assure those who are, or who may become, interested in this effort, that no pains will be spared on my part to hasten a favourable decision; but to strengthen my hands in asking for the most favourable terms, the strongest guarantees will have to be given cheerfully, and the successful as well as the unsuccesful should show readiness to realize the public aspects of this question.

WEST INDIAN FRUIT

DURIAN.

The durian, next to the mangosteen the most famous fruit of the Malay region, is now established at Jamaica, Trinidad, Dominica and other parts of the West Indies. Fruit has been produced on several occasions at St. Aroment estate, the property of Dr. H. A. Alford Nicholls, C.M.G., near Roseau at Dominica, and plants have been distributed in Dominica and elsewhere. A fine ripe durian fruit was presented by Dr. Nicholls to the Commissioner of Agriculture on April 10.

In 1880 there was a fine tree of durian, 25 ft. high, at the Bath Garden, Jamaica, but we are not aware whether this still exists and it has fruited.

No durian is mentioned as growing at the Castleton Gardens, Jamaica, in the list of plants given in the *Bulletin* of the Botanical Department published in the latter part of 1894.

The following interesting account of the durian, of which there are evidently many cultivated varieties, is taken from the *Agricultural Bulletin* of the Straits and Federated Malay States for August 1902:—

> The durian tree varies a good deal in height, and this seems chiefly to depend on the soil in which it is grown. In stiff clay, especially on hill slopes, it never seems to thrive, but on low flat alluvial soil it often attains an enormous height, over 100 ft. In bad soils it not only is stunted and short-lived, but it often, though flowering regularly and heavily, never sets a single fruit. The tree is always raised from seed and takes about ten or twelve years to produce fruit.
>
> It flowers in April and May or later, producing fruit in six months. The fruit varies a good deal in size and flavour. A very large kind weighing 10 or 15 ℔. is known as Durian Kapala Gajah. A small seedless variety chiefly obtained from Buru, is Durian Tembaga. I have met with a curious variety in which the fruit, which was very large, had a hole in the top, and inside was another small durian complete, with the spiny husk replacing the placenta of the fruit. A good durian should have little of the strong odour for which it is famous, and have plenty of pulp on the seeds. The characteristic flavour of onions common in inferior fruit should be absent, and the pulp of a creamy and not stringy consistency. Green durians, with slender close spines on the husk, are always poor in flavour. The fruit should be of a clean light brown, with rather distant conic spines, and but little odour. It is ripe when the husk begins to split and does not keep at all well, requiring to be eaten as soon as it is quite ripe.
>
> The durian is supposed to be very strengthening, especially for children. It is indigestible, however, to some persons. The fruit is usually eaten fresh, but is sometimes used in making ices. Durian cake, Lumpuh, is made when durians are very abundant, by boiling the pulp with sugar and making it into rolls wrapped in Pandan leaves. It is more popular with natives than Europeans.
>
> The seeds are boiled and cut up, then cooked with cocoa-nut oil and sugared and eaten as a sweetmeat under the name of Keripi Durian, or they are pounded up to a flour and mixed with sugar to make cakes known as Dodol Durian
>
> *Lahia Kutejensis*, a native of Borneo, has been lately introduced into the Botanic Gardens. It is a tree very much resembling a durian, and its fruit is said to possess all the flavour of a good durian without the odour.

ORANGES AT TRINIDAD.

The following letter from Mr. J. H. Hart, F.L.S., Superintendent of the Botanic Station at Trinidad, is of interest as showing the possibility of exporting oranges from the West Indies in such a way that they will arrive in England in good condition:—

> It may interest you to know that some fairly large shipments of oranges have been made during the present season from a Trinidad estate, the owner of which is so fully satisfied with the results that he is making arrangements for a series of much larger shipments next year.
>
> The estate from which the oranges were gathered is one which was primarily established owing to the offer some years ago of prizes by the Agricultural Society at the instance of his Excellency Sir William Robinson, G.C.M.G., and won the second prize in the competition.
>
> The method of packing is that laid down in my paper, read before the Conference in 1900 (*West Indian Bulletin*, Vol. I, p. 300), at Barbados, and has been entirely successful. Cases, not barrels, were used, and many of the cases reached England with not a single orange rotten, and the greater number with less than 5 per cent.. These results were obtained without any special storage, while the cases were carried by the Royal Mail steamer to Southampton. There is room for hundreds to enter the trade without endangering prices.

PACKING ORANGES FOR EXPORT.

Frequent allusion has been made in the pages of this journal to the absolute necessity for care and attention in the matter of packing oranges and other fruit for export. With the increase of the fruit industry in the West Indies this question becomes every year of greater importance, otherwise the produce will, if badly packed, not only result in a loss to the shipper but will fail to gain the confidence of the market, and the industry will fall to the ground.

The following extract from a letter appearing in a recent issue of *The Times*, by Mr. Edward Berwick, gives an interesting account of the method of packing oranges as practised in California:—

The oranges, especially in districts where black scale *(Lecanium oleae)* prevails become disfigured by 'smut.' Special machines have been designed to cleanse the rind without bruising it and to sort the fruit to size. Orange boxes contain from 96 to over 300 specimens. These boxes are $25\frac{1}{4}$ inches by 12 inches. The sides are of $\frac{1}{4}$ inch and the ends and centre partition of $\frac{5}{8}$ inch lumber, pine or spruce. On one end is an attractive label and in one corner is plainly marked the number of fruits contained in the box. Each fruit is wrapped in thin paper on which is frequently printed the grower's name and address. The wrapping and packing are usually done by women or girls, who become very deft and speedy and earn good wages. The boxes are packed a little over full, so that the lid when nailed keeps the fruit from shaking. This is very important because, if loose, the oranges bruise in transportation.

A NEW TRINIDAD FRUIT.

An interesting account is given in the *Bulletin of the Royal Botanic Gardens, Trinidad*, for October 1902, of the discovery, at the Bocas islands, of an edible fruit which had hitherto only been known as occurring at San Domingo. The fruit in question might possibly prove a welcome addition to those already familiar in the West Indies and is described by Mr. Hart as follows:—

A few weeks since Mr. Blache Fraser of Port-of-Spain was good enough to send for examination specimens of a fruit which he had found at the Bocas islands. The fruit appears to be little known, as, locally, no one has yet been able to identify it. Examination showed it to belong to the order *Myrtaceae*, and, therefore, not likely to contain matter injurious to health. Moreover, it is freely eaten by birds. It is yellow, $2\frac{1}{4}$ inches in length by $1\frac{1}{2}$ inches in breadth, and has a yellow melting pulp, surrounding one or more smooth, irregularly globe-shaped seeds. I can personally testify that the aroma and taste of the fruit are good, and that it is well worthy of being cultivated as a table fruit. In appearance the fruit is somewhat similar to the ordinary rose apple or pomme rose, but it is more elongated, and of a rich apricot colour. A specimen sent to Kew has been provisionally determined as *Anamomis esculenta*, previously known only from San Domingo.

WEST INDIAN PRODUCTS.

Ramie Fibre.

The question of utilizing the fibre of the Ramie plant has occupied the attention of scientific workers for many years. The fact that the fibre of this plant is embedded in a gummy matter has always offered a great obstacle to the extraction and preparation of a clean and bright article at a moderate cost. Many processes have been brought forward from time to time and several thousands of pounds have been spent in endeavouring to solve the problem connected with decorticating the fibre and producing threads suitable for the spinner. In spite of this there are still many obstacles to be overcome before the Ramie fibre industry can be said to be placed on a good commercial basis. It is probable that most of the Ramie fibre now in use is prepared by hand in China. That efforts are still being made to introduce machinery for this purpose may be gathered from the following extract from an article by Mr. J. R. Jackson, A.L.S., in a recent issue of *The Gardeners' Chronicle*. Mr. Jackson states:—

'Quite recently notices have appeared in the *Lancet* and other publications on the application of the fibre for the manufacture of underclothing, a factory having been set up at Carlskrona in Sweden for this special purpose. Ramie underclothing is said to be superior to wool, cotton, linen, or silk; further, it is more durable, is unalterable in its texture, does not shrink and its properties are unchanged in spite of wear and washing. . . . In consequence of these characters many advantages over other materials are claimed for it, namely, that it does not hinder perspiration but facilitates it, and secures complete ventilation, receiving warmth from, and returning it to the skin; further, that it is cooling during oppressive heat and warming in cold weather, and above all, that it prevents the germination of diseases of the skin, rheumatism, etc.'

Cocoa-nut Butter.

Reference was made in previous numbers of this journal (Vol. I., pp. 53 and 259) to the use, in England, of the oil extracted from the kernel of cocoa-nuts for cooking purposes, and also as the source of 'nucoline' or cocoa-nut butter. A similar use is now being made of the oil in France, and the product manufactured therefrom is placed on the British market as a substitute for butter under the name of 'vegetaline.' The *Pharmaceutical Journal* referring to the above, says:—

Vegetaline is the name given to a preparation of cocoanut oil which is being manufactured by a Marseilles firm and placed on the British market as a substitute for butter. Hitherto vegetable butter, or 'cocoline,' could not be used as a substitute for table butter owing to the fact that it would melt at a temperature of 25° C. Now, however, "vegetaline," as prepared by the Marseilles firm referred to, will remain solid up to 31° C.

The same journal mentions the fact that M. Paul Pollatschek, discussing the various attempts that have been made to remove the acrid taste and unpleasant odour from cocoa-nut oil, 'concludes that the most successful is the action of superheated steam in the absence of air, but even the fat thus purified, which is quite free from odour, gradually imparts to margarine, containing as little as 5 per cent. of it, a distinctive odour.'

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 96 of this volume.

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Agricultural News

Vol. II. SATURDAY, APRIL 25, 1903. No. 27.

NOTES AND COMMENTS.

The Jamaica Cassava Company.

The prospectus of the Jamaica Cassava Development Company has been published in the *Jamaica Gleaner* of March 23 last.

The company, which has been formed with a capital of £10,000 has for its object the development of the cassava industry in that island and the manufacture of cassava starch for export.

Amongst other proposals, it is the intention of the company to acquire lands in Jamaica for the cultivation of cassava, to erect factories for manufacturing the starch, and to purchase raw cassava from the small growers. The scheme also includes the establishment of stock farms for raising horses and cattle for sale and use on the company's plantations.

Brooms and Broom Corn.

We publish on page 142 of this issue an interesting paper on the cultivation of broom corn and the manufacture of brooms and brushes, by Mr. W. N. Sands, the Curator of the Botanic Station, Antigua.

Mr. Sands has proved that broom corn can be raised in these islands, and, at the meeting of the Antigua Agricultural and Commercial Society when his paper was read, he exhibited specimens of locally made brooms and brushes, of better quality than those imported. It would appear that this industry is specially suitable for peasant proprietors.

The Work of Agricultural Instructors.

Mr. Murdo McNeill, the Agricultural Instructor at Grenada, contributes the following interesting information with regard to his work in that island during the month of February last:—

'A week was spent in Carriacou for the purpose of acquiring information with respect to the cotton industry of that island. Sites for three school garden plots were also selected.

A spraying experiment was carried out at Black Forest estate (Grenada) with the object of testing the efficacy of a copper sulphate solution (5 oz. copper sulphate to 6 gallons water) for ridding the cacao trees of moss and lichens. The result, so far, shows that a solution of the strength above described is only effectual in killing the more delicate kinds of moss, the hardier kinds not appearing to suffer in any way.

Energetic efforts are being made in St. Andrew's parish by the Hon'ble G. Seton-Brown and Mr. St. Hilaire to rid the cacao trees of 'thrips' on the lines suggested by the Imperial Department of Agriculture. The 'Knapsack' sprayer was used for this work and was found sufficiently powerful for the tallest trees when used with an extension pipe.

Forking and pruning operations have commenced on many estates and also on a great number of peasant holdings. The cacao crops are coming to a close. Lately pickings have been small and it is the general opinion that the crop will be only an average one.'

Improvement of Cotton in India.

In the *West Indian Bulletin* (Vol. IV., pp. 52-3) mention is made of experiments which are in progress in the United States, with the object of producing improved varieties of cotton.

Experiments having this same object in view are being carried out in India. In an article in *Indian Planting and Gardening* for January 3, 1903, it is stated that there has been for some years a steady deterioration in the quality of Indian cotton. To meet this the Agricultural Department has attempted to introduce various American and Egyptian cottons of superior quality; unfortunately, however, these exotic varieties are not adapted to the conditions prevailing in India, and it is some years before they become acclimatized. Moreover, as soon as this happens the varieties begin to deteriorate.

The most hopeful results, so far, have been obtained by hybridization. These experiments have only been in progress for a year, but already several hybrids have been produced which promise well. The objects in view are stated to be the combination of 'the branching habit of growth, the vigour, the good staple and the comparatively high percentage of lint to seed of the 'goghari' and 'deshi' varieties with the early ripening of the 'varadi'.

Of course in such a large field as India numerous varieties will be required to meet the needs of different localities and this demand is being met by a carefully prepared scheme of cross fertilization, which has in view the production of an improved hybrid suited to the requirements of each district.

Barbados Grass Canary.

In the *Agricultural News* (Vol. II, p. 56,) a list was given of the more common birds of Barbados. A fuller list with notes by Colonel Feilden, C.B., was published in the *West Indian Bulletin* (Vol. III, pp. 333-52). Mention is there made of the appearance in Barbados, in recent years, of a small finch, striped black and yellow, known in the parish of St. Philip as the 'Grass Canary.' Through the kindness of Mr. A. A. Evelyn, of Spencer's, specimens of this bird were obtained and forwarded to the British Museum (Natural History) for identification. Dr. Bowdler Sharpe has been good enough to compare them and he states they are *Sycalis luteiventris*. Similar specimens were communicated from Barbados by Mr. Eustace Bowen in July 1897. This species is not included in Colonel Feilden's list of the birds of Barbados nor in Mr. Wells' list of the birds of Grenada. It is also absent from the list of the birds of Jamaica published in the *Hand-book of Jamaica*, 1881, pp. 103-17. Probably it is a recent introduction into the West Indies from the mainland of South America.

The Use of Artificial Manures.

This subject is well treated in a leaflet (No. 80) recently published by the British Board of Agriculture. It is pointed out, first, that however good and carefully thought out general schemes of manuring may be, they must fail in exceptional cases. The only remedy for this is for each farmer to find out for himself the manurial requirements of his own holding. More than this, if his land be of variable character, he should find out the requirements of each field.

It is pointed out that though the measuring and weighing and the loss of yield, which some of the experiments involve, mean expense, yet the information obtained is worth many times the sum spent, which need not exceed £5.

The series of experiments, which is recommended, necessitates the use of eight plots, treated per acre as follows:—(1). No manure; (2). 1 cwt. nitrate of soda; (3). 5 cwt. superphosphate; (4). 3 cwt. kainit (or sulphate of potash); (5). 1 cwt. nitrate and 5 cwt. superphosphate, (6). 1 cwt. nitrate, and 3 cwt. kainit; (7). 5 cwt. superphosphate and 3 cwt. kainit; (8). 1 cwt. nitrate, 5 cwt. superphosphate and 3 cwt. kainit.

To ascertain the effect of nitrate the plots should be compared as follows:—Plots (1) and (2) for the result of using nitrate alone; Plots (3) and (5) for the result of using nitrate with superphosphate; Plots (4) and (6) for the result of using nitrate with kainit; Plots (7) and (8) for the result of using nitrate with both superphosphate and kainit. In a similar way other plots may be compared to test the effect of phosphatic and potash manures.

By adding a few supplementary plots information as to the best kind of nitrogen, phosphate or potash may be obtained, and further, the best quantity. A similar series of experiments, modified where necessary to meet the different conditions, would probably yield information of great value to agriculturists in the West Indies.

Cacao and Coffee in West Africa.

São. Thomé and Principe are two small islands belonging to Portugal lying in the Gulf of Guinea off the west coast of Africa. According to the British Consul's report for 1902, the chief products of São. Thomé are cacao and coffee, but while the production of the former has greatly increased during the last fourteen years, that of coffee has greatly diminished during the same period. The amount of cacao produced in São. Thomé and Principe in 1888 was 1,518 tons, in 1896 it had risen to 7,669 tons, and in 1901 to 14,914 tons. In 1888 the coffee produced in these islands was 2,206 tons, while in 1901 it was only 1,092 tons. It is stated that the coffee production will probably diminish still further 'as all the attention of the planters is bestowed on cacao, which seems to be specially favoured both by the soil and climate'.

Eucalypts as Improvers of Climate.

In a previous issue of this journal *(Agricultural News*, Vol. I, p. 284) we mentioned that eucalyptus trees were to be used in Jamaica for draining the swamps round St. Ann's Bay. The question as to whether eucalypts are of use in improving climatic conditions has been a much debated one and cannot yet be regarded as finally settled.

In *Bulletin No. 35* of the Bureau of Forestry (United States Department of Agriculture) on 'Eucalypts Cultivated in the United States,' the author, Mr. A. J. McClatchie, M.A., discusses the subject fully. He points out that the planting of eucalypts in Italy, in the Roman Campãgna, is generally regarded, not only by private individuals, but also by the Italian Government, as having caused a great improvement in the sanitary conditions there. M. Carlotti, who has made a thorough study of the eucalypts in Corsica, gives a large number of instances of improved climate, which have been attributed to the planting of these trees. Others, who have investigated the subject in various parts of the world, also claim that the planting of eucalypts has diminished the amount of malaria. On the other hand, some investigators maintain that the fact of the improvement of climate by eucalypts has not been established.

The author concludes that, probably, some of the change in the sanitary conditions, attributed to eucalypts, has been due to other causes, such as draining, etc., but that it is entirely reasonable to believe that, to a certain extent, they must beneficially affect the atmosphere in the region of their growth. As the author, however, points out the trees 'serve so many other useful purposes that the question as to their effect upon climate may be waived, and the planting of them still go on from other motives..... Eucalypts may be confidently grown for a forest cover, for wind-breaks, for shade, for timber, for fuel, for the oil and honey they furnish, and if, at the same time, they improve the sanitary condition of the region in which they are growing, the reward of the planter will be so much the greater.'

INSECT NOTES.

The 'Silver Fish.'

Amongst the common household pests of the West Indies is a small glistening insect of some quarter to half-an-inch in length, which is found in cupboards, store-rooms, and shelves, wherever clothes, books or similar articles are kept. It runs rapidly when disturbed, creeping away into any dark corner, and has a peculiar slippery feel, not unlike a fish. Hence its popular name of 'Silver fish,' though it belongs in reality to the lowest group of insects. It is credited with considerable destructive powers especially to books, but, possibly, this is often exaggerated. Starch and gum are favourite foods, also the glaze on paper or linen. Housekeepers know it under a variety of names and they may perhaps recognize it from the above account. It is not difficult to check, though, like all household insects, persistence is needed rather than any elaborate measures. Arsenic mixed with starch paste and spread on bits of card is a satisfactory bait which may be laid down in odd corners. Molasses and boracic acid is another simple bait, applied in the same way. Clothes and other articles should be aired from time to time and cupboards cleaned out periodically. Like the black beetles of the legend, 'they hates the light because their deeds is evil,' and a hatred of cleanliness is another characteristic. Pyrethrum or insect powder can be used in bad cases, but there should be no necessity for it, with order and cleanliness and an occasional dose of poisoned starch.

Sooty Blight in England.

It appears that a sooty blight, somewhat similar to that so common in the West Indies, just now, is equally familiar in some parts of the United Kingdom. From a report of the consulting botanist of the Royal Agricultural Society of England, recently published, we extract the following:—

> A black mould, *Capnodium salicinum*, was found covering the leaves of currant bushes. This fungus is found on many different kinds of leaves and looks like a layer of soot. Specimens of oak leaves were examined that were black with it. The fungus is entirely superficial and never penetrates the leaf. It grows on the honey-dew secretions of plant lice (aphides) and spreads with great rapidity. It injures the tree by excluding the light and weakening the vigour of the leaf. The only way to combat the fungus is to destroy the aphides which produce the honey-dew and so prevent the formation of the 'soil' on which the mould grows. For this purpose a resin wash has been found to be the best insecticide.

COTTON.

Cotton Machinery.

The following interesting information respecting machinery for ginning and baling cotton is contained in a letter received from the Hon'ble James Wilson, Secretary of the United States Department of Agriculture:—

> Washington, D.C., January 2, 1901.
>
> Your letter of December 12, requesting information in regard to machinery for ginning and baling cotton, has been received.
>
> The cotton grown in your region is doubtless of the Sea Island type, producing a long staple which requires a roller gin to separate it from the seeds without injury. The Pratt roller gin, sold by Mr. Pollitzer of Beaufort, South Carolina, is in almost universal use in the Sea Island cotton district from South Carolina to Florida. The Bailey-Lebby Company, 213, Meeting Street, Charleston, South Carolina, are American agents for the McCarthy roller gin, which is used almost exclusively in Egypt. The cotton grown in that country is of the long-staple Sea Island type, but it is somewhat shorter than the Sea Island varieties grown along the South Atlantic coast in this country. This same company is also agent for a smaller hand gin, known as the Mann IXL roller gin. It is probable that this gin would be most satisfactory for experimental work on a small scale.
>
> Saw gins are manufactured by the Northington, Munger & Pratt Company, Birmingham, Alabama; Eagle Cotton Gin Company, Bridgewater, Massachusetts; E. Van Winkle Cotton Gin Company, Atlanta, Georgia; Globe Iron Works, Memphis, Tennessee; and Texas Gin and Machine Works, 205, Elm Street, Dallas, Texas. Nearly all of these companies manufacture baling machinery as well as gins.
>
> (Sgd.) JAMES WILSON,
> Secretary.

Cotton in East Africa.

We have already drawn attention in this journal (*Agricultural News*, Vol. II, p. 121) to the successful attempts that are being made to introduce the cultivation of cotton into West Africa; it would now appear that British East Africa is also a possible locality for the growing of cotton. We take the following from the *Board of Trade Journal* for January 22, 1903:—

> The *East Africa and Uganda Mail* in a recent issue, puts forward various inducements for the cultivation of cotton in East Africa. Few countries, it is stated, afford such facilities for cotton growing as British East Africa. In most of the cotton producing countries the land has to be cleared at great expense to the producer, whereas in East Africa far stretching plains of rich black soil exist without a shrub. The rainfall is good, and without the aid of artesian bores or windmills, irrigation should not be difficult. It is pointed out that cotton does not require the skill and patience that is necessary for the successful production of tobacco, vanilla, cacao, etc. The commonest coolie could plant cotton and the natives would like such work. Besides the great demand for the raw material, the seeds as fodder for cattle are very valuable, as well as for their oil. A determined effort should be made to push this industry, and to make British East Africa famous as a cotton mart. There are hundreds of natives who might well be engaged in such an industry.

Cotton at St. Lucia.

With reference to the interesting account of cotton cultivation at St. Lucia published in the last number of the *Agricultural News* (p. 121) Mr. Hudson desires to state that the 'small, bearded, green seed variety,' is the good kind of cotton, while the 'large, bearded, green seed variety' is practically worthless. We hope our readers will note this correction.

THE SENSITIVE PLANT.

This plant *(Mimosa pudica)* is a native of tropical America and is now widely distributed in most tropical lands. The plant owes its name to the curious behaviour of the leaves when touched or shaken.

The leaf is bi-pinnate, that is the leaf-stalk (petiole) gives off four branches, on each of which are borne numerous small leaflets arranged in pairs. When a leaf is stimulated (by touching, shaking, burning, etc.,) the leaflets move upwards in pairs, closing up against one another; the four branches of the petiole also close up against one another and the main petiole drops through about 60 degrees.

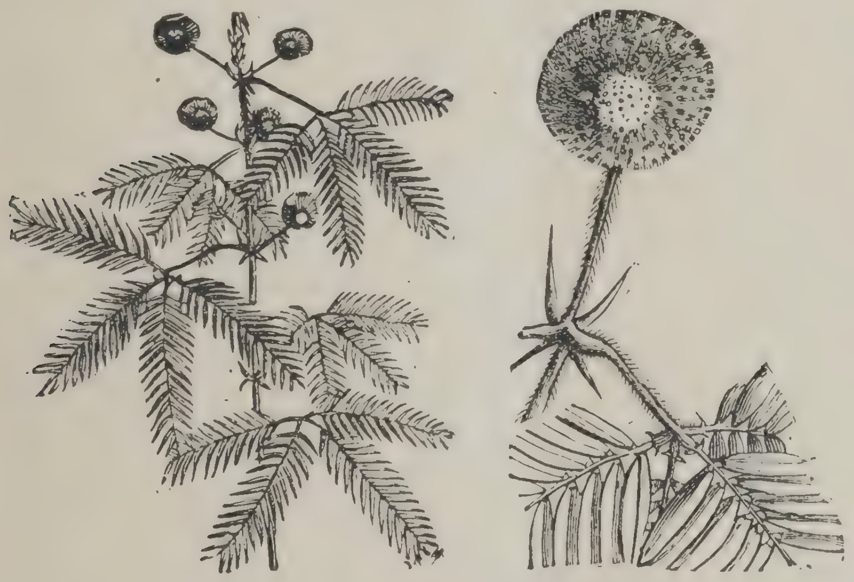

Fig. 10. The Sensitive Plant.

Showing foliage and inflorescence.
From *Dictionary of Gardening.*

The best way to see the movements taking place in proper sequence is to apply a match to the tips of some of the leaflets furthest from the stem.

The movements are brought about by means of a swollen joint or pulvinus at each point of movement. The mechanism of the process is interesting and has led to a good deal of discussion. Those who are interested will find an account in *Nature*, October 1890.

The biological use of this sensitiveness has also been a matter for discussion. Sachs was of opinion that it served as a protection against heavy hail-storms which might injure the leaves if they remained expanded. Stahl, on the other hand, says that it is a protection against animals; that the sudden folding and dropping of the leaves (which also reveals the spines at the base of the leaf-stalk) frighten away animals such as goats when about to make a meal of the leaves.

BUTTER-MAKING IN THE WEST INDIES.

Inquiry has frequently been made of this Department as to whether butter-making, as an industry in the West Indies, can be conducted on a profitable basis. It has been impossible hitherto to give information of a reliable character with regard to this, owing to the absence of statistics from persons who, in addition to possessing a practical knowledge of dairying, have also given butter-making a trial in the West Indies with improved churns and separators such as are used in northern climates.

Quite recently the subject has received attention in Antigua from Sir Gerald Strickland, K.C.M.G., the Governor-in-chief of the Leeward Islands. An Alpha Laval cream separator and Disc churn were imported into that island in December last and experiments in butter-making carried out under the direction of Mr. W. N. Sands, the Curator of the Botanic Station, who has had some experience in dairying in England with improved methods.

Mr. Sands contributes the following interesting notes with regard to the experiments:—

> The milk was obtained from grass fed cows. It took from $2\frac{3}{4}$ gallons to 3 gallons of milk to make 1 ℔. of fresh butter. The churn used held sufficient cream to make 3 ℔. of butter at a churning. Five pounds of ice were required to cool the cream before churning and also for working and drying the butter afterwards. The chief difficulty experienced was getting the butter-milk out without causing the butter to become greasy. In Antigua milk is sold at 2*d.* to $2\frac{1}{2}$*d.* per bottle ($1\frac{1}{2}$ pints) or about 1*s.* to 1*s.* 3*d.* per gallon. Butter-making, under these circumstances, is expensive, but where milk is cheap and plentiful as in Montserrat, the cost would probably be much less. The skim-milk was sold at 1*d.* per bottle or 6*d.* per gallon. Except for the difficulty of keeping the temperature down, all the operations can be carried on as in an English dairy.

Mr. Sands' experience with regard to the quantity of milk required, ($2\frac{1}{2}$ to 3 gallons) to make 1 ℔. of butter agrees very closely with that of persons who have tried butter-making in Barbados. Milk is sold in Bridgetown at 3c. per pint, or about 1*s.* per gallon, and working on the figures supplied by Mr. Sands it is reasonable to conclude that 1 ℔. of butter would cost, in the first instance, about 3*s.* to make it. The selling price of fresh butter is usually about 2*s.* per ℔., and, as there is little demand for skim-milk in the island, the sale of this by-product cannot be taken into account as forming a set-off against the cost of the butter. These figures, it should be mentioned, which are not of an encouraging character, apply only to butter-making in the district around Bridgetown, where green fodder has to be purchased for the cattle and where fresh milk always commands a sale. On the other hand, in the country districts of the island, where fodder is plentiful and fresh milk cannot be readily disposed of, butter-making is said to be a remunerative industry. Skim-milk is a valuable food for rearing calves and pigs and is probably utilized with profit in this way.

Mrs. F. H. Watkins of Montserrat also states that it takes about 20 pints of milk to give 1 ℔. of butter in that island.

EDUCATIONAL.

Barbados.

SPEECH DAY AT HARRISON COLLEGE.

In the *Agricultural News*, Vol. II, p. 106, there appeared the Reports of the Local Examinations and Lectures Syndicate of the University of Cambridge on the teaching of Natural and Agricultural Science at Harrison College.

We now publish extracts from the Reports of the Governing Body and the Head Master and the substance of an address given by Dr. D. Morris, C.M.G., when presenting the prizes on Speech Day, April 9.

The Governing Body, of which His Lordship the Bishop is chairman, reports:—

The success of Cutting (the Barbados Scholar of 1901) is very gratifying as proving that the Science Department at the college is doing good and sound work.

The Governing Body wish again to express their thanks to the Imperial Department of Agriculture and Dr. Morris for the very valuable assistance given to the college in the way of exhibitions and in the teaching of Agricultural Science, the teaching of which, in a scientific and practical manner is, the Governing Body think, of vital importance to the island.

The Head Master (Horace Deighton, Esq., M.A., F.R.A.S.,) reports:—

Science now forms an important Department of the College. The success, at Cambridge, of Cutting, the Barbados Scholar of 1901, is a good augury and, proving as it does that the teaching of Science is very thorough, will no doubt be an incentive to others.

By the liberality of the Imperial Department of Agriculture, Agricultural Science is grafted on to the rest of the Science curriculum and forms indeed the most important part thereof; for it is madness to shut our eyes to the fact that for the future we must avail ourselves of the discoveries of Science and that Agriculture must be pursued scientifically, otherwise the outlook will be gloomy indeed. I should like to draw the attention of parents of boys, who are destined to carry on the most important industry of the island, to the offer of Dr. Morris to provide a few Exhibitions for the assistance of boys in their training as scientific agriculturists. These exhibitions more than cover the whole College fee, leaving, in fact, enough to pay for the necessary books, etc. It is difficult to believe that parents will be so short-sighted as not to avail themselves of so liberal and advantageous an offer.

The following are brief extracts from Dr. Morris' address:—

You have heard the reports from the Governing Body and the Head Master just read, and you will agree with me they are of a very favourable character.

The people of Barbados are naturally proud of their educational institutions and especially of Harrison College. The boys, that have been taught here, occupy distinguished positions, not only in the West Indies, but in other parts of the world.

We find that the Barbados Scholar of 1897 (Roberts) has completed his classical course at Oxford and passed into the Indian Civil Service. The Scholar of 1901 in Science (Cutting), at his first College examination, won a Foundation Scholarship at St. John's College, Cambridge, and his further career will be watched with great interest. The Scholar of 1902 (Sealy), at his first College examination, has won a premier scholarship in Mathematics at Balliol College, Oxford.

It will be observed that these scholarships have been successfully won at the English Universities in classics, science and mathematics, thus showing that in all three fundamental subjects the education given at Harrison College is not only sound and effective, but equal to that of the public schools in England.

Reference is made in the Reports to the teaching of Agricultural Science and the assistance afforded by the Imperial Department of Agriculture. The Governing Body state that in their opinion this teaching, carried out in a scientific and practical manner, is of vital importance to the island. The Head Master adds that 'in the future we must avail ourselves of the discoveries of science and that agriculture must be pursued scientifically, otherwise the outlook will be gloomy indeed.'

The action taken by the Imperial Department of Agriculture at Harrison College is only part of a large scheme, which, I am glad to say, is gradually extending over all the West Indies and embracing all classes of the community. What is aimed at is that the entire youth of these agricultural colonies should be intellectually trained in an atmosphere favourable to agriculture, and be equipped so that, with the practical training they may afterwards receive, they will be able to cope successfully with their competitors in the battle of life. We seek to bring the lecture-room, the laboratory and the field to work hand in hand and turn out young men well fitted for carrying on agricultural investigations and provided with sound scientific knowledge by means of which they will deal intelligently and successfully with the many problems that will confront them.

It is hoped that the young men so trained will receive sympathetic treatment at the hands of proprietors and attorneys, and, provided they are otherwise suitable, that preference will be given to them in appointments connected with agricultural work in this island. I understand that some of the young men who have passed through the agricultural course are already engaged on estates and one (Mahon) is being now employed in chemical charge of a sugar boiling house.

St. Kitt's.

LECTURES TO TEACHERS.

The first of a series of lectures to teachers in the primary schools in St. Kitt's was given on March 21, by Mr. J. Belling, B.Sc., Agricultural and Science Master at the Grammar School of that island. Mr. Wm. H. Mitchell, M.A., Head Master of the Grammar School who presided at the lecture writes as follows:— 'I feel that these lectures will prove of great value to the teachers. I took the opportunity of emphasizing the importance of maintaining their interest in and attendance at the lectures. Mr. Belling has taken very great pains and trouble to furnish the teachers not only with information, but also with the best methods of imparting it and of cultivating their pupils' powers of observation.'

'The subject of the lecture,' Mr. Belling writes, was 'the germination of seeds treated as subject-matter for object lessons to children. The following seeds were discussed and illustrated by specimens and drawings:—bean, pumpkin, pear, pigeon-pea, sand-box (or castor oil), maize, cocoa-nut.' Practically all the teachers in the island were present at the lecture.

Industrial Education at Barbados.

The Barbados *Agricultural Reporter* for March 14, has the following notes on this subject. We may add that we do not necessarily endorse the opinions therein expressed:—

> At the present we have too much education of the doubly expensive sort which results in soft-handedness and idleness, and a deeply instilled aversion even to handle the honest working tools of agriculture. Our present educational system has driven the people from the fields, and the best agricultural workers in our island are those who were born and bred before its deteriorating influences came into vogue. We do not want more education, compulsory or otherwise, of the present type, that turns out so plentifully the street idler, but of that wiser industrial sort which fills the brain with useful knowledge and teaches the fingers to fashion something of practical value, or at least to earn their daily bread. The street idler will no doubt enjoy the cricket and football, which have been suggested for his moral benefit, but somebody must feed him while he plays. We would suggest that the best way to raise him to a higher plane of moral existence is to begin with him at an early age and to teach him independence, by training him educationally to be his own bread-winner. It is to be feared that too many of the street offenders against morality and decency, a plentiful crop of whom may be found in every city of the world, have so grown up in idleness as to be beyond reclaim. But a proper vagrant law would, in this island, be sufficient to restrain a too public exhibition, and force many of the elder performers in street rows to greater privacy, while the younger might be taken in hand by some one or other of those paternal or maternal organizations to which his Excellency alludes. But unless we organize more industries in this island and inaugurate a sound system of industrial education, not merely on the pot plant scale, but more widely to meet daily needs, we shall continue to turn out an annual crop of idlers, each one of whom knows how far the sun is from the earth, but possesses not so much earthly skill or knowledge as will incline him to set to work to earn an honest penny. These matters are within the range of practical politics if we would but reform on practical lines our present wasteful system of education.

LICHENS ON TREES.

In the course of experimenting to destroy the Orange Bark borer, a useful method was found for destroying the lichens and other epiphytes on trees. In these experiments, a mixture of crude carbolic acid, whale oil soap, clay and water was applied to destroy the grubs of the orange bark borer. The first application of this mixture destroyed the lichens and epiphytes on the bark, leaving it clean and sound.

The mixture is made by dissolving 2 ℔. of whale oil soap in 1 gallon of hot water, adding 1 pint of crude carbolic acid (phenol), and then adding 10 gallons of water and enough clay to thicken the mixture like white wash. The cost of applying this mixture with a brush, with the cost of materials, is found by Mr. E. A. Agar of Dominica to be about 7*s.* 6*d.* per acre of lime trees.

This mixture is useful also for the scale insects that so frequently attack the bark of citrus trees and could be profitably applied to lime trees for both purposes. On cacao probably the whale oil soap might be omitted, as scale insects are rarely found on the bark of these trees. Further information on this subject was published in the *West Indian Bulletin*, Vol. III, p. 189.

WEATHER NOTES

Dominica.

The rainfall for Dominica during 1902 has just been published in the *Official Gazette*. The highest fall (230·88) inches was at Middleham estate,—this is possibly the highest anywhere in the West Indies; the lowest was 53·12 inches at Maconcherie. The average rainfall at 30 stations in Dominica in 1902 was 113·10 inches.

Antigua.

At Antigua during 1902 the highest rainfall (70·69) was at Blakes estate, the lowest (41·11) inches at Marble Hill estate. The average rainfall at 71 stations in Antigua was 58·80 inches. The average rainfall for 29 years from 1874 to 1902 inclusive, was 46·42 inches, so that the rainfall for 1902 was 9·38 inches above the average.

MONKEYS IN GRENADA.

Mr. M. McNeill, Agricultural Instructor at Grenada, contributes the following notes:—

The mountain forests of Grenada are inhabited by large numbers of monkeys, but they are so shy that one may live in the colony for years without seeing them. Their bark, however, may be heard almost any morning from the Rest House at the Grand Etang, situated in the centre of one of the finest forests in the island at an elevation of over 2,000 feet. A road leading from St. George to Grenville passes through this mountain forest and gives the travellers, from a comfortable buggy, a rare opportunity of seeing tropical virgin forest scenery. Having passed along this road many times without seeing any monkeys I was pleasantly surprised one morning recently to see one take a flying leap across the road, a space of 30 or 40 feet. Altogether four jumped across the road and several older-looking ones walked across. Their landing point was a rather small branch which appeared well worn from frequent use, being evidently a favourite crossing point. The branch from which they took the spring was much higher up than that on which they landed; if they missed the latter there was nothing to prevent them being dashed on to the roadside. The Grenada monkey when young makes an amusing and affectionate pet. The black people sometimes catch monkeys by making them drunk with a decoction composed of sugar and rum, and sometimes by wounding them. The Grenada monkey is sometimes very destructive to cacao growing in the higher lands. They make a small hole at the free end of the pod and then scoop out all the beans. Rats usually attack the pods at the side. In both cases it is the mucilage that is sought after and not the beans.

Sugar-cane Experiments in St. Kitt's.

Mr. Lunt, the Curator of the Botanic Station, St. Kitt's, reports the completion of the work of reaping the sugar-cane experiment plots in that island. The work commenced on March 2, and finished on April 2. There were 562 plots reaped, of which 234 were manurial experiments and 328 experiments with varieties of cane.

GLEANINGS.

Onions from Antigua and Montserrat have been recently selling at New York at $2.00 to $2.50 per crate of 50 ℔. each.

Bay wood, so largely used in cabinet-making, is a variety of mahogany obtained from the forests bordering on the Bay of Honduras.

'Since Mr. Chamberlain's effort to aid Jamaica the importation of bananas into England has risen from one and a half million to three and a half million bunches per annum.' *(Our Western Empire.)*

According to a New York Market Report for March 12, 1903, Jamaica oranges were worth $5.00 to $6.00 per barrel, and grape fruit $6.00 to $8.00 per barrel.

Those interested in mule breeding, or who propose to purchase and keep stallion jacks, are recommended to obtain and read an excellent article that appears in the March number of the *Journal of the Jamaica Agricultural Society.*

The weather is spring-like just now, showery and pleasant, at Grenada. Trees are bursting into leaf as though we had emerged from the dry season and were entering the month of May. Late sowings of corn (maize) in the district around the Botanic Gardens are fresh looking and strong, promising early crops.

For the purpose of improving the breed of cattle in British Guiana, the Board of Agriculture has ordered, through the Department of Agriculture of Canada, three Holstein cows, in calf or milk, and a pure-bred short-horn bull, not to be over three years old. The animals are expected to arrive shortly by one of the Canadian steamers. It is hoped that the short-horn bull, above referred to, will be more successful in British Guiana than those lately imported into St. Lucia and Antigua.

Mr. W. E. Broadway, the Curator of the Botanic Station in Grenada, writes that an experiment plot for grapes has been started in that island at Victoria, St. Mark's, and one for pine-apples at Marli, St. Patrick's. The ground for the first named has been placed at the disposal of the Botanic Station by Mr. David Slinger, and the other by Mr. R. D. Hopkins, the manager of the Marli estate. Both plots were started towards the end of March, 1903. Grenada now has cacao, grape and pine-apple plots being carried on at the expense of the Imperial Department of Agriculture for the West Indies, and one for limes maintained and controlled by the local Agricultural Society.

It is officially stated that there are 9,000 acres planted in selected seedling canes this year in British Guiana.

We are glad to notice that West Indian copra (the dried fruit of the cocoa-nut) is appearing as an article of export. S. s. *Reveal* is reported to have carried 989 bags from Trinidad on March 10.

It is observed that, owing to cold weather in the United Kingdom and drought in Australia and California, the demand for Jamaica honey 'is now very good and there is keen competition amongst buyers to get supplies.' Nothing is now heard of 'over production.'

In growing English potatos in the West Indies it is always necessary to spray the plants from the beginning with Bordeaux mixture to maintain them free from disease. It has been shown that by spraying not only is disease kept thoroughly in check but larger potatos are obtained, and they keep longer.

A pod picked from a tree of *Parmentiera edulis* growing at Government House, Grenada, has a strong musk-like odour which, if retained in a dry state, might render the pods useful for placing among clothes, writing paper, etc.

Banana sugar is evidently a possibility. It is described in the *Sugar Planters' Journal* as possessing a distinct flavour, and is said to be pleasant and palatable. So far, difficulty has been experienced in making the sugar perfectly dry, but the producers hope in time to overcome this drawback.

The *Montserrat Herald* states that the different varieties of plants that have been introduced into Montserrat and the large number of economic plants distributed are indicative of the good work done by the Department of Agriculture in the improvement of the resources of the island.

The St. Lucia *Voice* of March 12 mentions having received some excellent specimens of vegetables grown on school plots at the Anglican School at Castries. The vegetables included cabbage, lettuce, celery, carrots, turnips and cucumber. Instances of this kind are encouraging as illustrating, in a practical manner, the results of the recent lectures to teachers in these islands delivered by the officers of the Imperial Department of Agriculture.

Bee-keepers in Barbados should keep a sharp eye on their hives during this month. There is usually a scarcity of nectar, with the result that swarming ensues. Removing queen cells is of little use and it entails considerable trouble with the risk of injuring the queen then in the hive. Swarming may be prevented and queen cells reduced by giving the bees plenty of room. The alternate use of one brood nest on top of another, keeping the queen always in the lower one and extracting from the upper, together with a set of empty extracting frames placed on the bottom board, is suggested as one of the means of avoiding swarming. By this means the queen is kept busy, but should the bees still persist in swarming, it would be well to 'shake' them during this month, so as to have bees of right age in time for the general honey flow about May. It is not desirable to oppose swarming too much because it may thus be delayed until the middle of the honey flow.

RECENT VOLCANIC ERUPTIONS IN THE WEST INDIES.

A most interesting account of the recent volcanic eruptions at St. Vincent and Martinique is contained in the March number of the *Geographical Journal*. This consists of a paper read before the Royal Geographical Society on January 12, 1903, by Dr. Tempest Anderson. It is illustrated by maps and thirteen beautiful photographs. In comparing the points of difference between the eruptions at St. Vincent and Martinique, Dr. Anderson states:—

The eruptions of St. Vincent have been altogether on a much larger scale than those in Martinique. The area devastated was considerably larger, the amount of ashes ejected probably ten times as great, and if the loss of life was not so large, this is accounted for by the absence of a populous city at the foot of the mountain. If such a city had existed at the mouth of the Wallibu river in St. Vincent in the position corresponding with that of St. Pierre, there can be no doubt that it would have been as completely destroyed as that unfortunate city. While both volcanoes show practically a single vent, this is much more marked in the case of St. Vincent, where, excepting the new crater which is really part of the old or main one, there is not a single parasitic cone. We saw no fumaroles, no hot springs, nor any trace of radial cracks and fissures.

On Mont Pelée, it is true, the main activity is confined to a restricted area about the summit of the mountain, and the top of the great fissure which extends or extended from this down in the direction of the Rivière Blanche; and there are no parasitic cones comparable, for instance, to those which are so numerous on Etna: but there are many fumaroles, which Professor Lacroix and his colleagues speak of as emitting gases hot enough to melt lead, though not copper wire. A telegraph cable has been three times broken at about the same place, and the broken ends on one occasion, at any rate, showed marks of fusion of the insulating medium. There are also several hot springs. Judging from these and other indications, it is most probable that the radial cracks entered deeply through the substances of the mountain, and penetrated even the submarine portion of its cone.

Flows of mud have also played a much more conspicuous part on Mont Pelée than in St. Vincent. Quite early in the eruption a great flow of this kind came down the Rivière Blanche and overwhelmed the Usine Guérin, which stood near its mouth, so that now nothing remains visible but the upper part of the chimney stack. It is probable that some at least of these mud-flows may have been due to the discharge of the small crater lake which existed before the eruption or to heavy rains, the water in either case behaving in a manner comparable to what we saw in the Wallibu; but, at any rate, they occupy a more prominent part in the descriptions of these eruptions than in those of the Soufrière.

Not only has the amount of erupted material been much less, but its distribution has been much more local than in St. Vincent, and this is accounted for by the great fissure at the top of the valley of the Rivière Blanche, which communicated with the main pipe of the volcano, and out of which the eruptions took place. This fissure, which was mentioned as existing in the eruption of 1851, pointed almost directly towards St. Pierre, and as the erupted material flowed out almost like a fluid, it was directed straight down on the doomed city. The lowest portion of the lip of the crater of the Soufrière was much broader and more even, so that the incandescent avalanche which descended from it was spread much more widely.

ST. VINCENT.

The following extracts are taken from a despatch from the Right Honourable the Secretary of State for the Colonies to the Governor of the Windward Islands published in the St. Vincent *Government Gazette* of March 19, 1903:—

I have the honour to acknowledge the receipt of your despatches of the dates and numbers noted in the margin on the subject of the damage caused by the volcanic eruptions in St. Vincent, the manner in which the relief fund has been administered, the extent to which assistance may legitimately be given to particular estate-owners who have suffered losses, and the policy by means of which the future prosperity of the island can best be promoted. . . . .

I have given careful consideration to the various reports by Captain Young which you have forwarded to me; and I have much pleasure in expressing my entire concurrence in the high terms in which you speak of his services in your despatch No. 13 of January 27. . . . . I have also noted with pleasure Captain Young's testimony to the good work done by the Administrator and Messrs. Kernahan, Powell, Rice and Preston.

I am glad to learn from paragraphs 54 and 63 of Captain Young's principal report that he considers that, thanks to the assistance which has been forthcoming from various sources, the eruptions have not materially affected the future prospects of the island. . . . .

I have received from Dr. Morris an interesting letter reporting upon his recent visit to St. Vincent, and it is a pleasure to me to read in the 23rd. paragraph of that letter: 'As far as my observations go I am satisfied that the Government have throughout administered the Relief Funds most judiciously and in full sympathy with the requirements of the sufferers.' Dr. Morris informs me that he has communicated a copy of his report to you, and you will doubtless consult with him and avail yourself of his advice upon matters relating to the agricultural future of the island.

You will no doubt also consult with Dr. Morris and report to me your views as to any measures of re-afforestation which may be desirable when practicable, with regard to which I would refer you to paragraph 38 of Captain Young's report to this Office of December 29.

In Praise of Spinach. Some doctors say that spinach is the most precious of vegetables on account of its medicinal and strengthening properties. The emollient and laxative virtues of spinach, owing probably to the salts of potash it contains, have long been known. It is excellent for the liver and as a consequence freshens the complexion. Some vegetables contain a relatively large dose of iron. According to Boussingault, the proportion is ·00074 of iron in 100 parts of French beans, ·0083 in 100 parts of lentils, and spinach very much more. The chemist Bunge has proved that spinach and yolk of eggs are proportionately richer in digestible and assimilable iron than are the most renowned ferruginous remedies. Its great value and growing importance is shown in the fact that spinach is already an active ingredient in several new tonics.

We would add that spinach is one of the most familiar of West Indian vegetables. There are many sorts: Green Calalu, Spanish Calalu or Poke weed, the Giant Cocks-comb and Indian-Kale. We may also mention an African spinach introduced into the West Indies by Mr. Millen, Curator of the Botanic Station at Tobago. The native name is 'Tete' and it is probably one of the Amaranths.

BROOMS AND BROOM CORN.

The following notes were read at a meeting of the Antigua Agricultural and Commercial Society, February 6, 1903, by Mr. W. N. Sands:—

The subject to which I desire to draw attention to-day is the cultivation of broom corn and the manufacture of brooms and brushes. The experiments so far conducted in this island indicate that it is an industry especially suitable for the small proprietor. The cultivation of broom corn is carried on to a large extent in the United States and corn brooms are at present imported from that country and sold in the local stores. Doubtless, most of you are familiar with them. During the latter part of last year (1902) it was decided to start a trial plot of this corn at the Experiment Station in order to ascertain whether brush of good quality could be raised under local conditions. I have here to-day samples of brooms and brushes made locally from the corn brush raised on this plot, and I have also rough samples of imported corn brooms for your inspection. At this stage a short description of broom corn, its growth and harvesting may be of interest.

The so-called broom corn is a millet closely allied to Guinea corn (*Sorghum vulgare*). In fact up to the flowering stage it is difficult to distinguish one from the other.

Seed of American broom corn was obtained from Messrs. Peter Henderson & Co. of New York and sown on October 11, 1902, in rows 4 feet apart, at a distance of 2 feet from hole to hole in the rows. The plants made strong and healthy growth and were free from insect attack. Had the weather been favourable better results would probably have been obtained by sowing in September. On October 31, the seedlings were thinned out leaving only about half a dozen of the strongest plants to each hole. The plot was kept carefully weeded and the corn started to flower early in the following December. The first brush was cut on December 16, and two other cuttings were subsequently made, one on December 20 and the other on December 29, making three cuttings in all. It was found that the whole crop from the time of sowing to harvesting required only about eleven weeks. This is an important consideration.

With regard to cutting and harvesting the brush, care must be taken to reap it at the right time. This occurs when the anthers, or, as they are popularly termed the 'blossoms,' fall off and before seed is formed. If the seed is allowed to form, the brush, when cured, will be hard and brittle; but, on the contrary, if cut at the right stage it will be tough and elastic. A good deal also depends on the colour of the brush. The best brush is of a light green colour when cured. In order to obtain this colour the stalks when cut must be carefully dried in a shed or store-room. If they are allowed to dry in the sun they turn brown and are of much less value.

In favourable weather the brush takes three or four days to cure. It is then cleaned. This process consists in removing the hulls and immature seeds by pulling the heads of brush through a toothed piece of board nailed to a bench. Where broom making is carried out on a large scale special separating machines are used. These machines, or rather the part which could not be made locally, could readily be imported at, I understand, a low cost.

Any soil on which Guinea corn thrives would probably be suitable for broom corn. There are several varieties of broom corn, most of which have been improved by selection in order to obtain a heavy yield and a long, straight brush of good quality.

The trial plot ($\frac{1}{10}$ acre) harvested at the end of last year gave just over 50 ℔. of cured and scraped brush. The average yield in the United States is reported to be from 500 ℔. to 600 ℔. of brush to the acre.

The actual manufacture of brooms and brushes can easily be learned. I refer more particularly to hand-made brooms, specimens of which I have brought for your inspection to-day. These brooms were made by Mr. Wellman of Church Street. Mr. Wellman, I may remark, has had some experience with the industry in America and has kindly offered to work up all the brush we have on hand into brooms and to assist us in every way possible. Mr. Wellman informs me that the brush grown here is of good quality, and he estimates that a fair profit could be made from the industry. Six grades of locally made brooms are exhibited. These Mr. Wellman states could be sold at a profit at the prices marked on them, viz: 1st quality 1*s.* 4*d.*, 2nd quality 10*d.*, 3rd quality 8*d.*; the small hand brooms at 8*d.*, 6*d.*, and 4*d.* respectively. I have also here two imported brooms purchased in one of the stores at 1*s.* each. It is easy to see that even the 3rd quality of our locally made brooms is superior to the imported article. It will also be noticed that the brush of our brooms is a better colour and finer texture, and that they are not stuffed with rough stalks in the middle; indeed, our broom is altogether a better article. About 8 ℔. of brush were used in making the three brooms and three brushes shown here to-day.

The industry especially commends itself to peasant proprietors who with a little practice would soon be able to manufacture the brooms for themselves. I have shown the locally made specimens to a merchant here who informs me that he would be willing to purchase a fair quantity of brooms like the samples for retail purposes. The brooms will be exhibited at the Agricultural Show on February 19. I should be glad if any of the gentlemen present to-day would bring them to the notice of visitors and so endeavour to interest people in the industry.

DEPARTMENT NEWS.

Mr. Francis Watts, Government Analyst and Agricultural Chemist in the Leeward Islands, has proceeded to England on special leave in connexion with proposals to establish a central sugar factory at Antigua. Mr. Watts will probably return early in June next.

Mr. W. G. Freeman, Scientific Assistant on the staff of the Imperial Department of Agriculture for the West Indies, left by last mail on three months' leave of absence on full pay.

Mr. W. N. Sands, Curator of the Botanic and Experiment Stations at Antigua, left by last mail on three months' leave of absence on full pay and six weeks' leave of absence on half-pay from April 8 last.

Mr. David Tannock, late Officer-in-charge of the Agricultural School at Dominica, has embarked for Canada on his way to take up his duties as Superintendent of the Botanic Gardens and City Reserves at Dunedin, New Zealand. General regret is expressed at the loss of Mr. Tannock's services in Dominica.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—March 31, 1903.—Messrs. A. E. De Pass & Co., Messrs. Kearton Piper & Co., Messrs. J. Hales Caird & Co., 'The Gardeners' Chronicle,' March 28, 1903, and 'The Public Ledger,' March 28, 1903.

Aloes—Curaçoa, 14/6 to 40/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 1¾*d.* to 3½*d.* per lb.
Balata—Surinam, 2*s.* 4½*d* per ℔.
Bees-wax—£7 5*s.* to £8 10*s.* per cwt.
Cacao—T'dad, 58/- to 68/- per cwt. ; Jamaica, 50/- to 55/- per cwt. ; Grenada, 52/6 to 58/- per cwt. ; Dominica, 52/- to 57/- per cwt.
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 35/- to 56/- per cwt.
Cotton—West Indian, 5⅜*d.* to 5¾*d.* per lb.
Fruit—
  Bananas—8/- to 12/- per bunch.
  Oranges—9/- to 14/- per case.
  Pines—2/- to 4/- each.
Fustic—£4 10*s.* to £4 15*s.* per ton. (Prices unchanged.)
Ginger—37/6 to 60/- per cwt.
Honey—Jamaica, 16/- to 23/6 per cwt.
Isinglass—West Indian, 1/3 to 2/- per ℔.
Kola Nuts—1*d.* to 4*d.* per lb.
Lime Juice—Raw, 9*d.* per gallon. Concentrated, £13 to £14 per pipe.
Logwood—£4 5*s.* to £4 11*s.* 3*d.* per ton.
Mace—1/7 to 2/2 per ℔.
Nitrate of Soda—Agricultural, £9 5*s.* per ton.
Nutmegs—70'*s* to 65'*s*, 1/10 to 2/4; 90'*s* to 80'*s*, 1/2 to 1/4, per ℔.
Pimento—2⅜*d.* to 2¾*d.* per lb.
Rum—Demerara, 8*d.* to 10*d.* per proof gallon. Jamaica, 1/6 to 7/- per proof gallon.
Sugar—Muscovado, 10/3 to 12/6. Crystallized, 14/6 to 16/- per cwt.
Sulphate of Ammonia—£13 10*s.* per ton.
Tortoise Shell—14/- to 24/6 per ℔. Yellow belly, 50/- to 55/- per ℔.

Halifax, N.S.,—'The Maritime Merchant,' March 12, 1903.

Molasses—Barbados, 25c. to 26c. per gallon.
Oranges—Jamaica, $6.00 per barrel, $3.00 to $3.50 per box.

New York,—April 3, 1903.—Messrs. Gillespie Bros. & Co. 'American Gardening,' March 28, 1903.

Bananas—Jamaica firsts, $1.20; eight hands, 85c. per bunch.
Cacao—African, 12¼c. to 12½c. ; Caracas, 13½c. to 14c. ; Jamaica, 10½c. to 11½c. ; Grenada, 11½c. to 12¼c. ; Trinidad, 12c. to 13c. per lb.
Cocoa-nuts—Trinidads, $16.00 to $18.00 ; Jamaicas, $17.00 to $19.00 per M.
Coffee—Rio, good ordinary 5c. to 5¼c. ; Jamaica, fair to good ordinary 5½c. to 6¾c. per lb. ; Manchester grades 8½c. to 10½c. per lb.
Ginger—Jamaica, 7½c. to 8c. per ℔.
Onions—Bermuda, $3.00 per crate; Havannah, $2.50 per crate.
Pimento—4⅜c. per lb.
Rubber—Nicaragua scrap, 66c. to 67c. per lb. Guayaquil strip. 61c. to 62c.
Sugar—Muscovado, 89°, $3\frac{13}{16}$c. per lb.; Centrifugals, 96°, 3⅝c. ; Molasses, 89°, 2⅞c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—April 8, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—17c. per gallon, package included.
Sugar—No quotations.

Barbados,—April 11, 1903.—Messrs. T. S. Garraway & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb.
Cacao—$12.50 per 100 lb.
Coffee—Jamaica and ordinary Rio, $8.50 to $9.00 per 100 ℔.
Hay—New Brunswick, 85c per 100 lb.
Manures—Nitrate of Soda $65.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $85.00 ; Sulphate of Potash $67.00 per ton.
Molasses—16c. per gallon, and $4.00 for puncheon.
Onions—Madeira, $3.00 per 100 ℔.
Potatos, English—$3.05 per 100 lb.
Rice—Nagra, $4.25 per bag (190 ℔.) ; Patna, $3.50 per 100 ℔. ; Rangoon, $2.75 per 100 lb.
Sugar—In hogsheads $1.25 per 100 ℔., and $5.00 for hhd. In bags $1.50 per 100 lb.

British Guiana,—April 9, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8.50 per barrel.
Cacao—Native, 11c. to 12c. per lb.
Cassava Starch—$7.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica, 11c. to 12c. per lb. (retail.)
—Creole, 11c. to 12c. per lb.
Dhal,—$3.80 to $3.90 per bag of 168 ℔.
Eddoes—$1.20 per barrel.
Molasses—Vacuum Pan, yellow, 16c. per gallon, casks included.
Onions—4½c. to 5c. ; Garlic 8c. to 9c. per lb.
Pea Nuts—Curaçoa, 3¾c. ; American, 5c. per lb. (retail).
Pigs—Boars and Sows, $5.00 each.
Plantains—24c. to 48c. per bunch.
Potatos, English—$3.50 per barrel.
Rice—Ballam, $4.75 ex store ; Patna and Seeta, $5.60 to $5.90 per bag.
  Creole Rice, 20c. per gallon (retail).
Sweet Potatos—Barbados, $1.20 per barrel.
Tannias—$1.20 per bag.
Yams—$2.16 per bag.
Sugar—Dark Crystals, $1.80 to $1.90 ; Yellow, $2.40 to $2.50 ; Molasses, $1.90 to $2.00 per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—Messrs. Edgar Tripp & Co., April 9, and Messrs. Gordon Grant & Co., April 7, 1903.

Balata—40c. to 41c. per lb.
Cacao—Ordinary, $12.25 to $12.50 ; Estates, $12.75 to $13.25 per fanega.
Coffee—6c. to 7c. per lb.
Onions—$3.25 to $3.66 per 100 lb.
Potatos, English—$1.40 to $1.60 per 100 lb.
Rice—Yellow, $4.25 to $4.35 ; White Table, $5.25 to $6.00 per bag.
Sugar—Yellow Crystals for local consumption, $2.25 to $2.40 per 100 ℔.
—Molasses sugar, $1.75 to $2.00 per 100 ℔.

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[33.]

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NEWS.

A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Hybrid Sugar-canes.

THE current issue of the *West Indian Bulletin* (Vol. IV, p. 63) contains an article by Mr. L. Lewton-Brain, the Mycologist and Agricultural Lecturer to the Imperial Department of Agriculture, on 'Hybridization of the Sugar-cane,' in which the possibilities of raising hybrid varieties of sugar-cane are discussed and an account is given of some observations by the writer on the structure of sugar-cane flowers.

The idea of raising hybrid sugar-canes is by no means a new one in the West Indies; it was raised by Professor d'Albuquerque at the second Agricultural Conference in 1900 (*West Indian Bulletin*, Vol. I, p. 182); Professor Harrison and Mr. Hart have both mentioned the possibility that some of the seedling canes, which are being raised throughout the West Indies, are the result of the accidental crossing of two varieties of cane, and in the *Agricultural News* (Vol. I, p. 146) we drew attention to some successful experiments that have been made in Java, by Drs. Wakker and Kobus, in hybridizing various varieties of canes, more particularly the Cheribon and an imported Indian cane, the Chunnee.

The process adopted in Java was an extremely simple one. Dr. Wakker discovered that the pollen (the part of the flower containing the male elements) of certain varieties of cane, notably the Cheribon, was infertile, while the ovary (the female part of the flower) was normal. Other varieties of cane, including the Chunnee, were shown to possess normal, fertile pollen. It was only necessary, therefore, to plant canes of two varieties, one with normal pollen and one without, in alternate rows, the wind would then carry the normal pollen of the one variety to the ovary of the other, fertilization would take place and seeds would be produced. These seeds, borne on the variety with infertile pollen, would, necessarily, be the result of a cross, and the canes raised from them would be hybrids. In the case of the Cheribon and Chunnee canes the experiment was a success: the Cheribon produced fertile seeds, and since then Dr. Kobus has succeeded in raising many thousands of hybrid canes.

The first question to arise in the mind of a practical man would be: Is it worth while? Or, in other words: What advantages does this new method of obtaining fresh varieties possess over the method of raising seedling canes which has been in operation for some years and which has been very successful? That the method of raising new varieties by hybridization does possess advantages over the simpler process of raising them by selection is amply shown by the fact that it is practised by plant breeders all over the world. It must be remembered, too, that the sugar-cane is, probably, the only cultivated plant, with regard to which the raising of hybrids is such an easy matter as described above. With other plants artificial crossing has to be resorted to, and this is a very delicate operation necessitating great care.

Mr. Lewton-Brain points out that crossing offers two advantages. In the first place the hybrid offspring of a cross is far more variable than pure-bred plants, so that the chances of obtaining a valuable seedling are proportionately increased. Again, it has often been found possible to combine in a hybrid the good qualities of both parents, as for example a large yield with excellent quality, or hardiness with good yield.

That this can be done is shown by the results obtained by plant breeders in other parts of the world. Messrs. Garton in England have obtained numerous hybrid varieties of wheat, oats and other cereals which combine the good qualities of both parents. Mr. Farrer in New South Wales, again, has succeeded in raising hybrid varieties of wheat which combine resistance to disease with high yield and other good characters. Hybrids between good wine-producing and disease-resisting varieties of the grape vine have also been obtained combining these qualities of the parents. It is, however, not necessary to go further afield than the experiments of Drs. Kobus and Wakker mentioned above. As a result of crossing the Cheribon and Chunnee, 'canes combining both high sugar content and disease-resisting power have been obtained.'

In Mr. Lewton-Brain's paper the results of his observations on the pollen of West Indian varieties of sugar-cane are given. Of the canes examined, sixteen varieties were found to possess 'a very small proportion of normal pollen,' while eighteen showed 'a large proportion of normal pollen.' It is evident that hybrids might easily be raised between two varieties, one from each of these classes, on the lines followed by Drs. Wakker and Kobus.

It must be remembered, however, that success must not be looked for at the first trial; hybrids will probably be obtained; but most, if not all, of them will prove inferior to the parents. If one or two good hybrids are obtained after very numerous trials, the experiments will be as successful as could have been expected.

SUGAR INDUSTRY.

Sugar-cane Experiments in the Leeward Islands.

The following is a brief progress report on the work in connexion with Sugar-cane Experiments in the Leeward Islands, for the period July to December 1902, forwarded by the Honourable Francis Watts, the Government Analytical and Agricultural Chemist in charge of these experiments:—

The early part of this period was employed in completing the reports on the experiments conducted during the season 1901-2. These were put forward in two parts. Part I dealing with the experiments with varieties of sugar-cane was completed and forwarded to Dr. Morris on August 12, 1902. Part II dealing with the manurial experiments was completed and sent to Dr. Morris on September 23, 1902. Owing to the abnormal reaping season, which considerably influenced the work, particularly in Antigua, some of the canes under experiment could not be reaped until towards the end of August.

Between the close of the reaping season and the end of December arrangements were made for the experiments of the coming season, the necessary fields were selected and prepared for the plant canes, and in some cases the canes were planted before the end of the year; in other cases the work of planting and manuring was performed after the period now under review. No results for publication, beyond those referred to above, properly belonging to the previous season, were obtained during this period, it being entirely one of preparation.

The experiments for which arrangements were made comprise the following:—

ANTIGUA.

Experiments with Varieties of Sugar-cane as Plant Canes:—

One central station for the cultivation of the main collection of canes, at Cassada Garden.

Six local stations for the cultivation of a limited number of selected canes, viz: twenty-three varieties, each in duplicate, at Tomlinson's, Thibous, Diamond, Bendal's, Blubber Valley and Friar's Hill.

Experiments with Varieties of Sugar-cane as Ratoon Canes :—
One central Station at Cassada Garden.
Six local stations as enumerated above, each with twenty-three varieties, each in duplicate.

Manurial Experiments with Sugar-cane :—
(1) Experiments with Plant Canes :
Two stations, Cassada Garden and Parham New Work, each with sixty-four plots, being thirty-two experiments, each in duplicate.
(2) Experiments with Ratoon Canes :
Two stations, Cassada Garden and Parham New Work, each with sixty-four plots as above.

Experiments were also planned to ascertain whether the suggestions which had been put forward in connexion with the use of Bordeaux mixture and of tar as dressings for the plant tops would be productive of good results in field practice.

ST. KITT'S.

Experiments with Varieties of Sugar-cane as Plant Canes :—
Nine stations for the cultivation of a number of selected varieties of canes at La Guerite, Buckley's, West Farm, Con Phipps, (where there are two stations, an upper and lower, in order to ascertain what varieties are most suitable for the higher mountain lands), Estridges, Molineux, Brighton and Canada.

Experiments with Varieties of Sugar-cane as Ratoon Canes :—
Seven stations cultivating the ratoons resulting from the experiments with plant canes in the previous season, viz : La Guerite, Buckley's, West Farm, Con Phipps, Estridges, Molineux and Canada.

Manurial Experiments with Sugar-cane :—
(1) Experiments with Plant Canes :
Two stations, Buckley's and Molineux, each with a series of sixty-four plots, being thirty-two experiments, each in duplicate.
(2) Experiments with Ratoon Canes :
One station with a complete series of sixty-four plots as above. (The experiments at the second station were abandoned as the site was not suitable.)

In addition to the above experiments a number of trial plots were laid out for the purpose of ascertaining the effect of potash and phosphates over a larger area than that covered by the two manurial stations. These are placed on five estates, viz : West Farm, Con Phipps, La Vallee, Brighton and Canada. These experiments will be reaped as plant canes in 1903, and will be continued as ratoon canes for reaping in 1904.

During the period under review, Mr. Sands, the Curator of the Botanic Station, Antigua, succeeded in raising a considerable number of seedling sugar-canes. This, in view of previous failures, is an encouraging new departure.

Crop Prospects in British Guiana.

The Demerara *Argosy* states that the canes due for reaping during the next twelve weeks are short for age, and do not promise a large percentage of juice. These canes have suffered from want of sufficient rainfall since the New Year, and the yield of sugar is likely to be more or less disappointing.

The young cultivation is making fair progress, but growth will not be vigorous until the rainy season sets in. The tillage necessary to the growing crop is practically completed and the soil is in excellent condition.

Beet Sugar in the United States.

The following facts, taken from the *Louisiana Planter* of August 9, 1902, are interesting as showing the profits to be made from beet cultivation in temperate regions and the uses that are made of the by-products of the industry :—

Official figures as to the profit to be derived from 60 acres of beets, as compiled by the Michigan Experiment Station after expert investigation, show that a profit of $33.03 per acre is made. The rent of these 60 acres is set at $420, the cost of the seed, the preparation, cultivation and harvesting, consisting of ploughing, fitting, drilling, seven cultivations, thinning, weeding, harvesting, delivering and labour of uncovering the beet pits is placed at $1,747.50, or a total expense of $2,167.50. The gross returns as stated by the Experiment Station are 780 tons of beets at $5.32 per ton, equalling $4,149.60, showing a net profit of $1,982.10 on the 60 acres.

The receipts for one week in July in the Detroit internal revenue office from the Base City distillery reached $54,000. At this distillery alcohol is made from beet molasses.

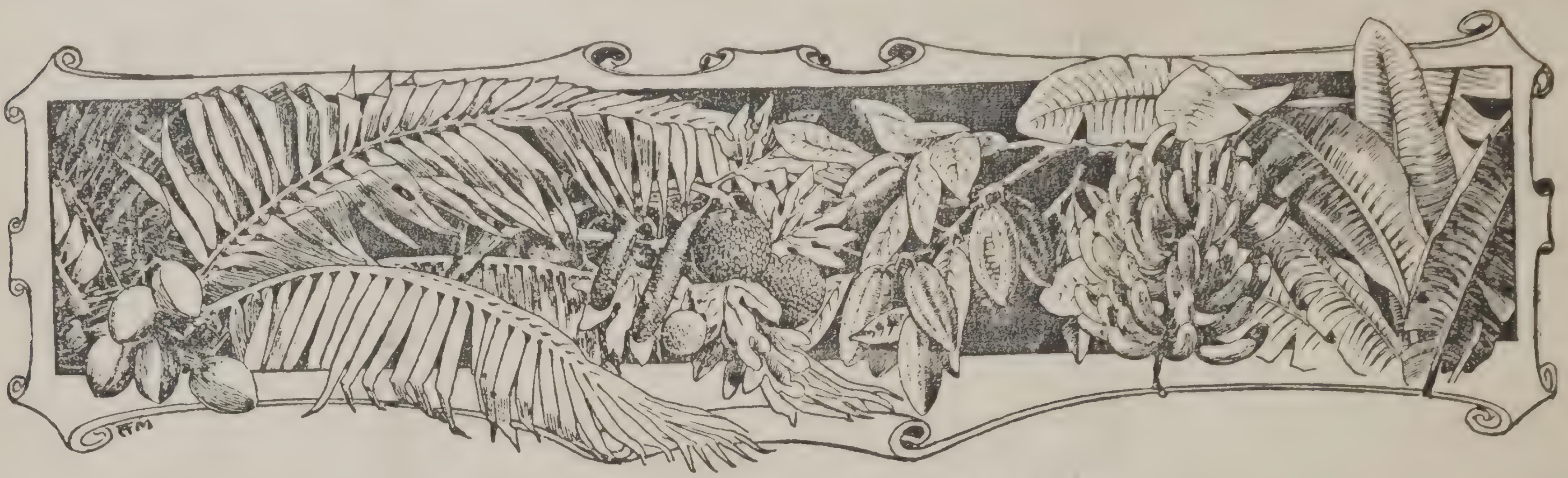
A prize of 10,000 marks ($2,380) has been offered by the Verein der Deutschen Zucker Industrie, a German national association of sugar beet growers and beet sugar manufacturers, for the best process of drying beet leaves and tops for cattle food. This move is started as one of the many economies now necessary on account of the low prices of sugar.

The result of this competition in utilizing for winter fodder what has hitherto been in our country almost a wasted element of beet culture will be worthy of the careful attention of sugar beet farmers in the United States.

IDEAS ABOUT THE WEST INDIES.

The following extract from the *Morning Post*, is interesting as showing that the West Indies are becoming better known than formerly. The extract, by request, is reprinted in the *Agricultural News* :—

The idea of the West Indies as a backward place, where planters spend their lives in lamenting the sugar bounties, while refusing to turn their attention to any other agricultural industry which might be profitable to the islands, does not stand the test of an examination of the reports which are constantly produced by the energetic Department of Agriculture for the West Indies, and which are reproduced in the equally energetic *Agricultural News* of Barbados. The most praiseworthy endeavours are being made to re-introduce cotton growing into the islands, and experiments are being made at St. Lucia, at Antigua, at Montserrat, where one hundred and twenty acres are under cultivation, at St. Kitt's with three hundred and twenty-four acres, and at Barbados. Altogether there are now five hundred acres under cultivation in the Leeward Islands, and in a number of places cotton is gradually taking the place of cacao and sugar on plots where those crops cannot be remuneratively grown. It is believed that cotton can be grown in these colonies not less profitably than in Texas, where, according to the United States Agricultural Bulletins, the average cost of growing cotton was $22.00 per acre, the lint produced 415 tb. per acre, and the average net profit was $15.00 per acre, 'larger, perhaps, than any profit from any staple cultivated on so extensive a scale.'



WEST INDIAN FRUIT

JAMAICA FRUIT CULTIVATION.

Under the agreements dated June 20, 1889 and April 19, 1900 respectively, with reference to a fruit and pessenger steamer service between Jamaica and the United Kingdom, the contractors are required, under clause 10 of the contract, 'at all times during the continuance of the contract, to provide and employ in Jamaica, at their own expense, not less than six skilled, experienced and suitable agents, who at all times during the said term shall use their best endeavours to improve by all practicable means the system of cultivation of bananas and other fruit in Jamaica, and shall instruct fruit growers in Jamaica with respect to such cultivation, and also with respect to the best and most approved method of harvesting and packing fruit.'

In the Jamaica *Gazette* of March 19, a letter from the agent in Jamaica of the Imperial Direct West India Mail Service to the Colonial Sceretary, is published by direction of his Excellency the Governor. From this we learn that the following six gentlemen have been appointed as experienced, suitable agents in accordance with the clause quoted above:—Hon. William Watson, Port Antonio; Mr. Robert Thompson, Kingston; Mr. S. S. Hislop, Kingston; Mr. Thomas Kemp, Kingston; Mr. Sylvester Cotter, Port Maria; Mr. William Turriff, Plantain Garden River.

CRATES FOR PINE-APPLES.

It is recognized that the only way to ship pine-apples to obtain good prices is in crates *not in barrels.* As stated by the Hon'ble H. Hesketh Bell in the *Agricultural News,* (Vol. I, p. 165,) 'pines in barrels are a by-word.'

The following particulars, respecting crates for pine-apples, received by the Imperial Department of Agriculture from Messrs. Gillespie Bros. & Co. of New York, are published for general information:—

> With reference to pine-apple crates, we advise that we have made considerable inquiries and have a quotation from a large firm of shippers here, who quote us on the standard size pine-apple crates in shooks in carload lots of 2,500 or more, 12½*c.* (6¼*d.*) each f.o.b. vessel New York harbour. Each crate consists of three ends 12″ x 10½″ x ⅞″, and eight slats 36″ x 4½″ x $\frac{5}{16}$″: the ends are securely tied 15 pcs. in a bundle and the slats 40 pcs. in a bundle. The price of these shooks in less than carload lots would be 14*c.* (7*d.*) each f.o.b. vessel New York harbour.
>
> We have also advices from a firm in Jacksonville, Fla. who state that there are two kinds of pine-apple crates used by them—one for the smaller varieties, such as red Spanish, which crate is 10½″ x 12″ x 36″ and consist of three heads 10½″ x 12″ and eight veneer slats ¼″ x 4½ x 36″. The heads are usually packed 15 to the bundle and the slats 24: the crates weigh about 18℔. each, and the rate of freight from Jacksonville to New York is 15*c.* per 100 ℔. This crate is offered to us at 9*c.* (4½*d.*) each f.o.b. Jacksonville. The other crate is designed especially for the larger varieties, such as Porto Rico and smooth Cayenne, etc., which pack from 12 to 18 to the crate. This crate is 12″ x 20″ x 24″ and consists of two panel heads 12″ x 20″ and twelve veneer slats 4½″ x 24″, these crates also weigh about 18 ℔. each and are quoted to us at 10*c.* (5*d.*) f.o.b. Jacksonville. The pines are packed in the 10½″ x 12″ crate in dozens or parts of dozens, as for instance, 18, 24, 36, 42, etc. The heads for the crates for larger pines are usually packed 20 to the bundle and the slats 20 or 40.
>
> From another manufacturer in Virginia we are offered the pine-apple crates in shooks, say, three ends each, 10½″ x 12″ x ⅞″ and eight veneer slats each 4¼″ x 36″ x ¼″, these come packed 15 ends in a bundle and 40 slats in a bundle. They also offer us another crate consisting of three ends each 6″ x 14″ x ⅞″, and four veneer slats 6″ x 36″ x ¼″ and two veneer slats 5″ x 36″ x ¼″. These come packed usually 15 or 30 ends in a bundle and 10 to 20 slats in a bundle. The price for either size crate is 12*c.* (6*d.*) each f.o b. vessel New York harbour, in carload lots of 3,000 or more. The number of pines packed in these crates depends very much upon the size, but their figure would be from 18 to 30 or more.

Coffee Substitutes. In these days of banana coffee, postum or wheat coffee, and negro coffee (from the seeds of *Cassia occidentalis),* it is somewhat strange that the merits of the seeds of the common ochro have been so long overlooked. At one time at Barbados ochro coffee appears to have been highly appreciated. We are informed that the late Mr. Amory, a veterinary surgeon, was a strong believer in the value of this coffee. At some seasons of the year ochros are obtainable at Barbados at one cent per 100 fruits. If a demand arose for ochro coffee Barbados could doubtless supply it in comparatively large quantities. The *Pharmaceutical Journal* of February 21, 1903, confirms the fact that the seeds of 'gombo,' *Abelmoschus (Hibiscus) esculentus,* have been recommended as a substitute for coffee. M. Rattier in *La Nature* is said to claim that this new substitute is far superior to many varieties of coffee and is sometimes even comparable with Mocha. At present, when really good coffee is so cheap, it is difficult, however, to understand why any substitute is necessary.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following article on the London Spice and Drug Market has been contributed by Mr. John R. Jackson, A.L.S., formerly Keeper of the Museums at the Royal Botanic Garden, Kew. Mr. Jackson's last article appeared in the *Agricultural News*, Vol. II, p. 125:—

In the month of March, which closes the year's finance, there is always more or less speculation and unrest in the produce markets, becoming more acute as the month expires and the Budget becomes imminent. At the time of writing this all-important statement is announced for April 23. The drug market is perhaps less affected than the other markets dealing chiefly with food products or the greater staples of trade. Consequently we have to report no great change since last month either in business generally or in individual articles.

GINGER.

It may be worth noting, however, taken in connexion with the notes on the grading of Jamaica ginger in comparison with that of Cochin (*Agricultural News* Vol. II, p. 25), that there has been an upward tendency for the Jamaica product during the month, which has been further confirmed at the sale on April 2, the report of which has just reached us at the time of writing, and to which further reference will be made in our next notes.

The report for March 12 was as follows:—Bold cut Cochin was bought in at 85*s.* to 95*s.* per cwt., good 'C' cut was held for 50*s.*, cut tips realized 42*s.* to 43*s.*, rough ends 36*s.* 6*d.* and cuttings 36*s.*, while small, bright Calicut brown, rough, sold at 34*s.* and fair, washed, rough was bought in at 45*s.* There was a good competition for Jamaica at this sale, which sold at 38*s.* to 41*s.* 6*d.* for small dark to middling dull. At the sale on March 26, the respective qualities of ginger stood thus:—Cochin, for which there was no demand and all the parcels offered were bought in, bold cut 75*s.* to 85*s.*, unassorted native cut 60*s.*, and fair to good washed, rough, 40*s.* to 42*s.* Jamaica sold with good competition at rather advanced prices as follows:—Ordinary and lean dark 37*s.* to 39*s.*, middling dull 40*s.* to 42*s.*, dull washed 43*s.* 6*d.* to 45*s.*, and good washed at 47*s.* to 48*s.* The Jamaica consignment consisted of 217 barrels, the bulk of which were new arrivals.

SARSAPARILLA.

At the sales at the beginning and end of the month sarsaparilla sold steadily, grey Jamaica being quoted at 1*s.* 2*d.* for sound and 1*s.* 1*d.* per ℔., for country damaged; palish yellow, mixed, native Jamaica sold at 1*s.* 1*d.*, and good, bricky, red was bought in at 1*s.* 2*d.* Twenty bales Lima Jamaica, country damaged, sold at 1*s.* and four serons Honduras at 1*s.* 2*d.* These prices were mostly maintained at the sale later in the month, but privately some small sales had been made at 1*s.* 5*d.* for grey Jamaica and 1*s.* 3*d.* for native.

KOLA NUTS.

Kola was represented at the first sale of the month by eleven bags of fair, bold, rather dull West Indian nuts, which realized 4*d.*, while mouldy West Indian fetched 1¼*d.*; good, natural, small and medium were taken out at 5½*d.* In connexion with West Indian kola it may be stated that the English trade journals have noted some facts on the low range of prices from the *Bulletin* of the Department of Agriculture, Jamaica, and draw special attention to the necessity of Jamaica shippers packing the seeds in such a way that they should arrive in a perfectly sound condition. Good sound West Indian seeds are at present very scarce in the London market and such would probably meet with a ready sale at 5*d.* per ℔.; indeed a bag of good, bright, natural West Indian realized this price at the sale on March 19.

ARROWROOT.

With regard to arrowroot, a more active market was reported at the end of the month than had prevailed at the beginning, owing to the fresh eruptions at St. Vincent, and several hundred barrels of medium to good manufacturing St. Vincent were sold at 1¾*d.* to 2¼*d.* per ℔. and 3½*d.* for fine quality, good St. Vincent having been bought in at 4*d.* in cases and 3¾*d.* in barrels, while Bermuda was bought in at 1*s.* 4*d.*

MUSK SEED, CASSIA FISTULA, CASHEW NUTS.

The following quotations for other West Indian products during the month may be referred to:—

Two barrels of musk seed from St. Lucia and Grenada sold at 1*s.* and 1*s.* 2*d.* per ℔. respectively. Good West Indian pods of *Cassia fistula* brought 39*s.* per cwt., while 12 cases of cashew nuts were sold at from 22*s.* 6*d.* to 25*s.* 6*d.* per cwt. These latter were, however, shipped from Bombay, but might as well have come from the West Indies.

Balata in Brazil.

The following is a translation of an article which appeared in *Der Tropenpflanzen* for March 1903:—

While hitherto balata has only been known as occurring in Guiana and in the lower regions of the Orinoco, and an exhaustion of the supply in the relatively near future has been feared, it is now reported that balata trees are widely distributed in the two Brazilian provinces of Para and Amazonas; the tree also occurs near the Purus, Acre and other tributaries of the Amazon. The trees are found part singly, part in large groups. The product obtained from the latex is in no way inferior to that obtained in Guiana, possibly it may be better. The method of extraction differs greatly from that employed for caoutchouc. The balata tree yields, on an average, about 3½ ℔.; a skilful worker can extract 40 ℔. to 50 ℔. daily. The sap is first subjected to a kind of fermentation process and the coagulated mass is then dried in the sun. In consequence of the lesser cost of recovery, the production of balata offers a better chance of profit than that of caoutchouc. Already concessions have been granted for the exploitation of the woods of the Brazilian region containing balata, and the extraction of balata on a commercial scale has begun.

CACAO IN CENTRAL AFRICA.

Mr. J. M. McClounie of the Scientific Department at Zomba, British Central Africa, writes:—

I am much interested in anything relating to cacao, and noticed the article by Mr. Hart in the *Agricultural News*, Vol. I, No. 4, on grafting *Theobroma cacao* on the stocks of *Theobroma bicolor*. Recent experiments at Zomba with *Theobroma cacao* plants from Kew seem to indicate that the earth temperature is perhaps too great for cacao to do well. At 4 feet depth at Zomba the average temperature for October, November and December is 81 and 82 degrees, and at 6 inches for the same months is 89 degrees. Perhaps you could let me know if these temperatures approach or exceed the earth temperature of that part of Jamaica where *Theobroma bicolor* is found wild.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 96 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d., post free 3s. 3d.

Agricultural News

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NOTES AND COMMENTS.

The West Indian Bulletin.

The first part of Volume IV of the *West Indian Bulletin* was issued on April 25. The following are the titles of the articles:—'Diseases of Logwood, Cocoa-nut, Cassava, etc., at Jamaica,' 'Methods of Corn Breeding,' 'Notes on Recent Work on Vegetable Ferments,' 'Cotton Growing in the West Indies,' 'Cotton Seed Industry in the United States of America,' 'The Root-borer of Sugar-cane,' 'Disease-Resisting Varieties of Plants,' 'Sugar-cane Experiments at British Guiana,' 'Hybridization of the Sugar-cane,' 'Bud Variation in the Sugar-cane,' 'Cassava from Colombia,' 'Cultivation and Preparation of Ginger,' 'Gambier in the West Indies,' 'Agricultural Progress at Bermuda,' and 'Notes on Fall of Volcanic Dust at Barbados, March 22, 1903.'

The last article contains some careful observations and measurements of the fall by the Rev. N. B. Watson, Dr. J. W. Spencer, M.A., F.G.S., Dr. D. Morris, C.M.G., Mr. J. R. Bovell and Mr. W. G. Freeman and Mr. E. Gillman. It also contains chemical and mechanical analyses by Professor J. P. d'Albuquerque, M.A., F.I.C., F.L.S., and a mineralogical analysis by Dr. Longfield Smith. Since the publication of this paper Mr. H. Millen, the Curator of the Botanic Station, Tobago, has forwarded a sample of dust collected in the southern part of that island.

Cotton Growing in the Leeward Islands.

Mr. W. N. Sands, the Curator of the Botanic Station at Antigua, reports that in August 1902 sufficient Sea Island cotton seed to plant one acre was distributed from that institution to each of fourteen estates in the island for experiment purposes. In some cases the growth of the plants was poor owing to bad situation and cultivation, in others the plants suffered severely from the attacks of a caterpillar pest. Mr. Sands remarks that the season was not at all favourable for conducting these experiments, heavy rains and periods of drought having considerably damaged the crop. One planter reports having obtained 500 ℔. of seed cotton per acre, another slightly over 400 ℔. per acre.

Crops at Trinidad.

The following is taken from the *Port-of-Spain Gazette* for April 23:—The cacao crop has now drawn to a close though on some plantations small pickings yet continue; flowers are commencing to show and if, as is anticipated, an early wet season comes on as well as a long one, a good crop is expected in the middle of the year. Cacao planters however, expect little or no crops next year. This year's excessive drought, excessive not so far as duration goes but in respect to severity of temperature, has killed many trees and these are now being supplied, others are being cut down below the ground in order to spring again next year.

The sugar crop will not be over for another six weeks or so and it has been up to the present fairly good. The price for farmers' canes has remained firm at 9*s.* per ton and this has encouraged farmers to renew their flagging energies with the result that many acres of, up to the present, abandoned lands have been planted in canes ready for next crop.

Insects as Disseminators of Disease.

The part played by mosquitoes in the dissemination of malaria and yellow fever is well known, and in the *Agricultural News* (Vol. I, p. 215) attention was drawn to an address by Sir James Crichton Browne in which the common house-fly was accused of being the carrier of many pathogenic bacteria. In a recent *Farmers' Bulletin* (No. 155) published by the United States Department of Agriculture, Mr. L. O. Howard gives a summary of the ways in which insects affect health in rural districts. The author mentions that in Egypt and Fiji the common house-fly is the agent in distributing the germs of a destructive eye disease of human beings, and that the germs of an eye disease known as 'pink eye' are carried by a small fly. Probably the germs of bubonic plague are transferred from sick to healthy people by the bites of fleas. The destructive 'Texas fever' of cattle is spread by the common cattle tick, and in Africa a similar cattle disease, identical with 'Surra,' is spread by the famous tsetse fly. Anthrax is conveyed from one animal to another by gadflies or horse flies, and malignant pustules result when these flies subsequently bite human beings.

Silk-Cotton.

An interesting article on silk-cotton yielded by the well-known silk-cotton tree *(Eriodendron)* of the West Indies appears in the April number of the *Journal of the Jamaica Agricultural Society*. There was a note on the subject in the *Agricultural News* (Vol. II, p. 24). As far as we are aware no one has devoted serious attention to this subject. Perhaps one great difficulty is to get at the pods which hang at the ends of slender branches of a lofty tree 40 to 70 feet from the ground. These pods must be gathered just before they begin to burst. But how? The next difficulty is to find, anywhere in the West Indies, a sufficient number of silk-cotton trees growing near one another to make it worth while to start a business of collecting and exporting the cotton. The seeds must be separated as in the case of ordinary cotton and the clean lint packed in bales.

Molasses as a Substitute for Oats.

We have often, in this journal, drawn attention to the value of molasses as food for stock (*Agricultural News*, Vol. I, pp. 66, 108, 124, 214) and it has been found that molasses can be substituted for corn and oats with satisfactory results. In an article quoted by the *Sugar Planters' Journal* of April 4, molasses is stated only to be of use as 'an adjunct to the ration of thriftless horses and such as are suffering from indigestion and other kindred troubles.' For others, such as ordinarily worked horses, growing and idle horses and brood mares living in hygienic environments, it is said that molasses 'would be needless and a nuisance.' The article states, also, that the countless numbers of flies and ants, which would be attracted by the molasses, would render this food detrimental rather than beneficial.

In an article in the same journal for March 28, entitled 'Molasses as a Stock Food,' mention is made of some experiments in hog raising with molasses by Colonel Wade Hampton which were entirely successful. Colonel Hampton is reported to have said that 'as a food for horses, as well as for cattle and hogs, it [molasses] excels anything I ever fed.'

Kola Nuts.

The demand for kola nuts from the West Indies is declining owing to the fact that France (formerly a large buyer) now imports its nuts direct from Africa, and that the so-called 'kola' drinks are not so popular as they used to be. The knowledge that an unlimited supply of nuts is always available in West Africa tends to cheapen the article and, according to Messrs. Gillespie Bros. & Co., there is no likelihood of a return to the rates ruling four or five years ago. We recommend that *Cola vera*, described as producing nuts with two large cotyledons, should be introduced to the West Indies. These nuts will, it is stated, always command a good price if they are carefully cured beforehand and reach their destination in good condition. The species now generally cultivated in the West Indies is *C. cauliflora*. In this the cotyledons are small and much divided.

Turtle Trade.

According to the *Jamaica Gleaner* anxiety is felt in reference to a proposal made by the Government of Nicaragua to impose heavy tonnage dues on vessels engaged in the turtle trade. For more than a hundred years vessels from the Cayman Islands (dependencies of Jamaica) have been engaged in turtle catching amongst the Cays on the Mosquito coast. In the opinion of the fishermen engaged in the trade the excessive tonnage dues which may be imposed next season are likely to kill turtle-fishing in this part of the world.

Sugar Manufacture in Java.

Under the head of 'Clarification' Mr. H. C. Prinsen Geerligs in his treatise on 'Cane-sugar and the Process of its Manufacture in Java,' states that two methods are in use—defecation, when just sufficient lime is used to neutralize the free acids of the juice, and carbonatation, when a large excess of lime is added to the juices, during which operation the temperature should not exceed 60°, the lime excess being removed by means of carbonic acid. By this latter means, better clarification is secured, for 'the viscous gummy matters are precipitated and a part of the glucose is transformed into harmless combinations.' Concerning the utilization of final molasses, Mr. Geerligs says that, as a fuel, it has not been satisfactory. 'When burned with bagasse it forms, at low temperatures, a bulky mass of coal, choking up the grate, while at a high temperature the silica from the bagasse combines with the lime and alkali of the molasses to form a kind of glass, which covers the grate bars, thereby preventing the free access of air.'

Improved Breeds of Goats for the West Indies.

With reference to the steps taken by the Imperial Department of Agriculture to improve the breed of goats in the West Indies, particulars in regard to which have already appeared in the *Agricultural News* (Vol. II, pp. 55 and 87), the following extract from an article on 'Goat breeding' in England, appearing in the *Farmer and Stockbreeder* of March 23 last, may be of interest. The writer alluding to the advantages and profits to be derived from goat breeding says:—

> It is well known that their milk is rich and very palatable, though there is not much of it. One great claim made by their advocates is their freedom from tuberculosis.
>
> Of pure-bred goats there are not many in the country. The two best known breeds, besides the native English, are perhaps the Anglo-Nubian and the Toffenburg. The former has been produced by crossing the best of our native stock with sires of Eastern origin. This breed has reached a high state of perfection in the herd owned by Baroness Burdett-Coutts. The Toffenburg goats are not numerous, but are increasing in number. They possess wonderfully good milk-producing qualities, and, crossed with the Anglo-Nubian or ordinary English goat, produce a strain of very deep milking animals.

INSECT NOTES.

The Godhorse.

An insect familiar to residents in Barbados is the stick-insect, commonly called the 'Godhorse.' It is held in awe by the negroes, who have superstitious beliefs about it, and the writer has seen negro women stand some yards from a single fully grown specimen and throw stones to crush it before they would pass it. This is probably due to its very uncanny appearance and movements. It is very much more stick-like than many stick-insects and does resemble the twigs, amongst which it lives, in an extraordinary way.

This insect is of interest as being new to science. It is placed in the genus *Bostra*, and is to be named specifically after the locality or finder. The eggs are interesting from their close resemblance to a seed. They are allowed to fall on the ground singly and require from three to six months in order to hatch. The young insect emerges by forcing off the lid of the seed-like case, and it is astonishing to see how large the insect is on hatching, in comparison with the small bulk of the egg from which it hatched. The food consists of leaves, apparently of a variety of plants, including pigeon peas, dunks, etc. The male is very much smaller than the female, and is often caught with the female insect, when popular belief declares it to be the young one. No economic importance attaches to this insect nor is its excessive increase at all likely, the life history probably occupying about one year to complete.

EXPERIMENT CACAO PLOTS.

From Grenada Mr. M. McNeill, the Agricultural Instructor, in his monthly report for January last, supplies interesting information with regard to the results of the manurial experiments now being conducted by the Imperial Department of Agriculture with cacao trees in that island:—

At the Vendôme plot, Mr. McNeill states, the section which received an application of lime, followed by sulphate of potash, has, up to the present, given most satisfactory results.

At Nianganfoix the largest yield is again recorded from the section treated with basic slag, followed by sulphate of potash. These plots are situated some miles apart and the soil in each case is typical of the lands in their respective localities. It is interesting to note that Professor Harrison, in his pamphlet on the *Rocks and Soils of Grenada*, referring to samples of soils taken near to the localities above mentioned, expresses the opinion that soils in the neighbourhood of Vendôme plot 'would be improved by a dressing of say 10 cwt. of air slaked lime per acre with an after dressing of 1 cwt. of sulphate of potash per acre applied in proximity to the trees.'

With regard to the locality around Nianganfoix he states: 'These soils are deficient in phosphates and low in potash. I am of opinion that these soils require heavy manuring with phosphates, say with basic slag at the rate of from 5 cwt. to 6 cwt. per acre, and with potash at the rate of 1 cwt. per acre of the sulphate.'

ONION INDUSTRY.

The following interesting information in reference to onions in New York has been communicated by Messrs. Gillespie Bros. & Co. It is encouraging to find that onions from the British West Indies 'compare well with Bermudas in quality and size'; on the other hand, we would draw special attention to the fact that 'the packing and branding are very irregular and these should be corrected *early* as these imperfections tell against them.'

Messrs. Gillespie Bros. & Co.'s letter is as follows:—

New York, April 2, 1903.

We are told Havanna has sent this season comparatively small quantities because prices were not attractive during the winter just ended. Usually Cuban onions are received regularly from January to March every year. Bermuda commences during March and last month (ten days ago) about 5,000 crates were received. We may mention that fair quantities have come forward from Antigua and Montserrat and have been sold at $2.00 to $2.25 per crate, prices which should satisfy the shippers. These British West Indian onions compare well with Bermudas in quality and size, but the packing and branding are very irregular and these should be corrected early, as these imperfections tell against them. The use of the stencil in all cases would ensure a uniform marking, and a little care in packing tightly, after the onions have been dried, should do away with the presence of slack on arrival in New York. These two features mean 15 cents to 25 cents per crate against them every time—if Bermudas or Havannas are being offered concurrently.

IMPORTANCE OF SCIENTIFIC KNOWLEDGE TO THE FARMER.

The *American Gardening* of January 17, quotes from the *New York Herald* the following opinions expressed by the Hon. James Wilson, Secretary of the United States Department of Agriculture, touching the needs of the farmer:—

Better knowledge of animal husbandry, of the physiology of plants, and the chemistry of soils, is most needed by the farmers of the United States as a gift of the year 1903. . . . The farmer who thinks is the farmer that is making the money by his crops to-day. We buy too much in the way of agricultural products from abroad—too much that might just as well be raised by ourselves within the limits of our own territory.

This year we shall have purchased $200,000,000 worth of plant products which we could have grown in the United States and, in addition, another $200,000,000 worth that might have been produced in our new tropical possessions. The more our farmers know, the more things they will be able to grow, and the richer we shall be. Half the people of this country live by the soil directly, and 65 per cent. of our exports go from the farmers.

If the foregoing be true of the United States farmer, it is even more so of the West Indian planter. We have in previous issues of this journal pointed out the great importance and need of educating the young generation of farmers and planters in the scientific principles underlying agriculture if we would obtain the best possible results from tillage of the soil.

The raising at home of products which are at present imported from abroad in large quantities is another point, the importance of which has often been emphasized in this journal.

TESTING SEEDS.

The following directions for testing seeds, especially those received from abroad, are published for the guidance of the officers of the Department and others interested in the subject:—

Seeds may fail to germinate from a variety of causes, even when exposed to the proper degree of warmth, moisture and oxygen. They may be too old, they may not have been sufficiently mature when gathered, they may have become too dry, they may have been subjected to freezing before sufficiently dry, they may have been stored when damp and thus subjected to undue heating, or they may have been damaged by insects or fungi either before or after maturity. Defects of these kinds are not always visible, hence seeds should be tested before planting to learn if they will germinate. It is unnecessary to plant seeds in soil to test them, since the seed-tester shown in fig. 11 is much more convenient. This useful device consists of two circular pieces of clean, moderately thick cloth of rather loose texture, a table plate that is not warped, and a pane of glass large enough to cover the plate. The cloths are dipped in water and squeezed a few times while under the water to press out the air. They are then wrung out until moderately wet, spread over the bottom of the plate as shown, and the seeds to be tested are placed between them. It is well to use a hundred or more seeds of each sample, as a larger number will show the per cent. of vitality more accurately than a smaller one, and the lot should always be well mixed before taking the sample. The plate should be kept covered with the glass to prevent evaporation from the cloths, and it may be placed in any room of comfortable living temperature. The seeds should be frequently examined and may be removed as they sprout, when, by subtracting the number that fail to sprout from the number put in, the percentage of vitality may be readily computed. The cloths should be placed in boiling water a few minutes before using them for a second test, to destroy any spores or mycelia of mould with which they may have become infected. (*Principles of Plant Culture*, Goff, p. 30.)

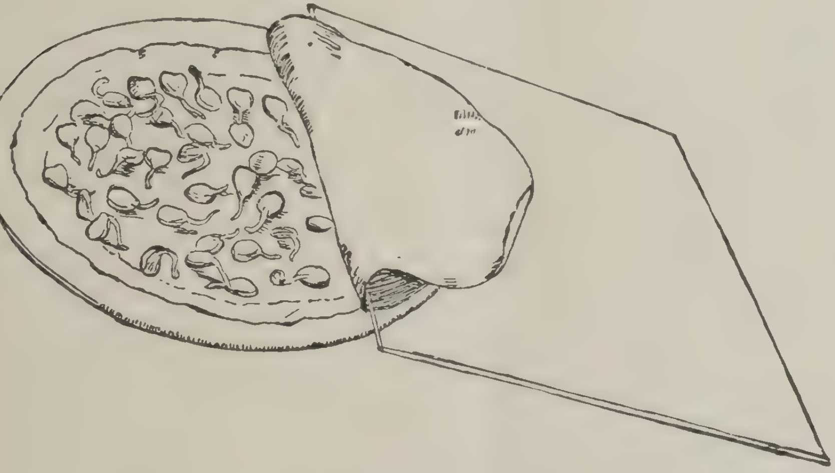

Fig. 11. A Simple Seed-Tester.

Showing the glass plate partly removed and the top cloth thrown back.

[From Goff's '*Principles of Plant Culture*'.]

AGRICULTURAL SHOWS.

St. Lucia.

This show took place, as announced in the *Agricultural News*, (Vol. II, p. 43), on March 27, at the Union Agricultural School. Mr. McHugh, the Secretary of the St. Lucia Agricultural Society, writes:—

'The Union show was a great success. It marked a very distinct advance in vegetable cultivation, good specimens of which came from all parts of the island. Honey also, well prepared for shipping and of fine flavour, was well to the fore with excellent specimens of bees wax. The show of onions was very good indeed.'

The *Voice of St. Lucia* mentions that the local branch of the Imperial Department of Agriculture sent sixty-one exhibits to the show. They were prepared at the Agricultural School, the Botanic Station and at the Riviére Dorèe Experiment Station.

The pupils of the Agricultural School put in forty-three exhibits. These were very creditable, and elicited much favourable comment from the visitors. But to our mind the most interesting feature of the show was the presence of the produce of School Gardens. The Anglican School in Castries, and the Roman Catholic School at Deruisseau, Micoud, sent in some capital assortments of vegetables, while the Roman Catholic School at Dugard, Choiseul, sent a very good exhibit of onions.

WEATHER NOTES

Anguilla.

The rainfall return from Anguilla for the years 1894 to 1902 inclusive, has just been received from Dr. J. Numa Rat, the Resident Magistrate in that island. The highest fall was in 1902 when 47·72 inches fell, the lowest in 1894 when 37·03 inches are recorded. The average annual rainfall for 9 years was 42·62 inches. Dr. Rat mentions that the rainfall from July to December is nearly double that of the first six months of the year. The heaviest monthly rainfall occurs during June and the last four months of the year. The average rainfall during the years 1896 to 1902 was highest in October and lowest in February.

Tobago.

Mr. H. Millen, the Curator of the Botanic Station at Tobago, reports that the rainfall recorded there, from April 1, 1902 to March 31, 1903, was 101·05 inches. He adds that this is the greatest yearly rainfall noted since the formation of the Station.

Rice. The rice industry in British Guiana is making good progress. New methods for hulling and curing the grain have recently been adopted and rice of superior quality has been turned out.

EDUCATIONAL.

Geography and Education.

The following extract is taken from an address by the Right Hon. James Bryce, M.P., at the annual meeting of the Geographical Association in 1902. Much of what Mr. Bryce says with regard to geography might be equally well applied to the teaching of science.

Speaking of geography as a method of teaching the art of observation, Mr. Bryce says:—

> All competent teachers of geography have now begun to feel that they ought to start out by giving the scholar a direct personal knowledge, and not a mere book knowledge, of the meaning of geographical terms and the elementary data of physical geography; that he ought to be taken round the place in which he lives; that he ought to be shown hills, or mountains, if he is fortunate enough to have mountains in his neighbourhood, and notice the rocks they are made of; that he ought to be taught to observe the course of rivers and brooks; that he ought to be led to study the inclinations of hills and the structure and features of an undulating country, or of plateaus, or of riverine plains; that he ought to be taught to observe the trees and the vegetation generally which appertain to particular kinds of soil, or to particular exposures; and to keep his eyes open and his memory alert to watch the winds and the rainfall, and to acquire a knowledge of the climate of the region in which he lives. All these things, about which he reads in his text-books of physical geography, ought to be made real and vital and full of meaning to him, by being connected with the actual facts, which he can note and remember when they are shown him, but which he will not probably notice unless they are pointed out to him. He lives among them, but he may never observe them (unless he is an exceptional boy) until his attention is called to them. Physical geography, communicated in that way by an active-minded and intelligent teacher, becomes one of the best possible of trainings in the art of observation, an art which might appear easy and natural, but which in reality requires a good deal of training, because no one knows, until some incident calls his attention to it, how many of the phenomena among which he moves he has failed to observe.

Object Lessons in Agriculture.

The following is quoted from the Demerara *Argosy* of March 28 last:—

> Object lessons in illustration of agricultural science will be given to pupil teachers and boys and girls of Standards VII and VIII of any grant-in-aid school on Saturday, 4th. proximo, and following Saturdays, at the undermentioned centres:—Saffon Street (Anglican) School by Mr. W. W. Wilson; Smith Church School by Mr. Fitz Greeves; Christ Church by Mr. T. Bruce-James; Friendship Wesleyan School by Mr. D. V. Jacobs, and Victoria Roman Catholic School by Mr. H. D. Dolphin. The lectures in town will commence at nine o'clock and those in the country districts at ten o'clock.

POULTRY.

The Hatching of Eggs.

The following note on the subject of the treatment of eggs during incubation and when about to hatch, is taken from the *Farmer and Stockbreeder* of March 23, 1903:—

> Hens' eggs are due to hatch on the twenty-first day of incubation, but if eggs were fresh when they were set many of them will hatch out a day earlier. Two days or three days before they are expected to hatch it is a good thing to sprinkle with lukewarm water during warm weather, or when the soil of the nest has long been in a dry condition. Indeed I usually give all such eggs a swim in a basin of fairly warm water for a couple of minutes with the best results. The inner membrane of the egg is thereby sufficiently softened, and the chicken has less difficulty in breaking. During incubation, if any eggs are broken in the nest they must, of course, be taken out. If the remainder of the eggs have been soiled in consequence, they must be completely sponged and cleaned with warm water, while the nest must be cleaned out and relined with fresh hay.

GINGER AT MONTSERRAT.

Mr. A. J. Jordan, the Agricultural Instructor in Montserrat, has supplied the following information with regard to an experiment in ginger cultivation in that island:—

The plot at the Grove Experiment Station, which had an area of one-fifth of an acre, was reaped on March 3, and gave a yield of rhizomes, ('roots') at the rate of 14,307 ℔. per acre. The land was spaded and the sets planted in April 1902. After planting, a mulch of three tons of pen manure was applied. Six weedings were given: two in May, one in June, two in July, two in August and one in September.

The total cost was as follows:—

		s.	*d.*
Spading land		6	7
Planting		2	1½
Spreading manure			10
3 tons of pen manure		10	0
Weeding		8	10
Digging, weighing, storing		14	4
Total	£ 2	2	8½

or £10 13*s.* 6*d.* per acre.

The weight of ginger used as sets was 248¼ ℔.

SURRA DISEASE.

The latest information in respect of surra disease in horses is contained in the following brief extract from a letter dated April 3, from Dr. D. E. Salmon, Chief of the Bureau of Animal Industry in connexion with the United States Department of Agriculture:—

> With reference to surra in this country, I would say that the Department of Agriculture has enforced strict quarantine regulations against horses and other susceptible animals from the Philippines, and it is therefore improbable that the disease will ever gain a footing among the animals in this country.

OUR BOOK SHELF.
NOTES and REVIEWS.

OBJECT LESSONS IN GEOGRAPHY AND SCIENCE, PART III. By David Frew, B.A., F.E.I.S.; *London: Blackie & Son, Ltd., 1901.* Price 1*s.* 6*d.*

This useful little book, although written primarily for teachers in England, should prove of service to their colleagues in the West Indies. The subject-matter, for the most part, is not directly applicable to the West Indies, though the lessons on 'Dairying and Cattle-Feeding,' 'Clay and Earthenware,' 'Cotton,' 'Sugar and the Sugar Trade,' 'Modes of Travelling,' etc., would require but slight modification before they could be utilized in these islands.

The great value, however, of this book, to teachers in the West Indies, lies in the method by which the information is given to the children. Every point to be impressed on the scholars is taught, not as a matter of faith in the teacher's knowledge, but as a matter of direct observation and experiment by the scholars themselves. The teaching of science by any other method is not only useless, but detrimental to the scholars' mental health.

THE NEWTON OBJECT-LESSON HAND-BOOK, London: Blackie & Son, Ltd. Price 1*s.* 6*d.*

This book contains a series of notes on object lessons for the use of teachers in English elementary schools. The notes are arranged under the heads of 'requirements,' 'subject-matter' and 'method' (in parallel columns), 'blackboard summary,' 'notes for the teacher,' 'notes for composition lessons', and a space is left at the end of each lesson for the teacher's 'memoranda.'

Many of the lessons, for instance, those on 'The Bat,' 'The Parrot,' 'The Cockroach,' 'Plants and the Air,' 'Ferns,' could be made direct use of in the West Indies, while others, such as 'The Buttercup,' 'The Primrose Plant,' 'Fruits,' could be used with very little modification.

The objects are well described and the method adopted in arranging the notes renders these very clear and intelligible.

THE BOOK OF THE DAIRY: A Manual of the Science and Practice of Dairy Work. Translated from the German of Prof. W. Fleischmann, Ph.D. By C. M. Aikman, M.A., etc., and R. Patrick Wright, F.H.A.S., etc., *London: Blackie & Sons, Ltd.* Price 10*s.* 6*d.*

Among the many excellent text-books and manuals which recent advances in agricultural science have called forth, the interesting volume of Prof. Fleischmann is worthy of a hearty welcome in its English form. The author is a recognized authority on the science and practice of dairying and the translation of his comprehensive work places at the disposal of dairymen and others in English-speaking countries a valuable manual complete in all the details of dairy management.

The first chapter gives an interesting description of the structure of the cow's udder, the formation and composition of milk, feeding and its effect on the milk supply. Some remarks on the respective properties of goat, sheep and mare's milk also find a place in the concluding pages of this chapter.

Following this comes a chapter on milking, milk-testing and the detection of adulteration in milk. Chapter III is devoted to milk in its relation to micro-organisms and bacteriology, while chapters IV and V deal with the practical side of dairying and give the student an accurate and lucid account of the manufacture of butter and cheese. The author next goes exhaustively into the various methods of preserving and sterilizing milk and, in describing the by-products of the dairy, gives an interesting account of kephir, koumiss, milk sugar and lactarine. The concluding chapters deal chiefly with the economic aspect of dairying and contain a brief account of the discovery and manufacture of 'margarine,' a substance which, although having little to do, yet enters largely into competition, with dairy products often to the disadvantage of the latter.

The work is well printed and illustrated and is full of information not only for dairymen but also for medical officers and those interested in the adulteration of foods generally.

We can confidently recommend this translation of Prof. Fleischmann's manual to all interested in the subject, and as a work of reference it should find a place in all Public Libraries in the West Indies.

TREATMENT OF MANURES.

The following hints are taken from the *Farmer and Stockbreeder* of April 5 last:—

The farmer is often at a loss to know what fertilizers to mix with safety without deleterious chemical combination taking place. The following should not be mixed:—

Farm yard manure, or dung with lime, or basic slag.
Nitrate with phosphatic slag.
Nitrate with superphosphate.
Sulphate of ammonia with phosphatic slag.
Superphosphate with slag.

Those that can be mixed with safety are as follows:—

Sulphate of ammonia with superphosphate.
Nitrate with bones.
Sulphate with bones.
Bones with slag.
Nitrate with phosphatic guano.
Sulphate with phosphatic guano.

At times some of the chemicals have a tendency to 'set,' *i.e.*, nitrate of soda and kainit, and thus have to be powdered again to enable them to be sown. Rub and, as soon as mixed, apply to land. Keep as dry as possible until then.

A Bacteria Lamp. A Reuter telegram from Vienna, dated March 15, says:—'Professor Hans Molisch, of Prague, has reported to the Vienna Academy of Sciences the discovery of a lamp lighted by means of bacteria, which, he claims, will give a powerful light and be free from danger, thus being valuable for work in mines and powder magazines. The lamp consists of a glass jar, in which a lining of saltpetre and gelatine inoculated with bacteria is placed. Two days after inoculation the jar becomes illuminated with a wonderful bluish-green light, caused by the innumerable bacteria which have developed in the time. The light will burn brilliantly from two to three weeks afterwards, diminishing in brightness. It renders faces recognizable at a distance of two yards, and large type is easily legible by it. Professor Molisch asserts that the lamp yields a cold light which is entirely safe.' *(The Times).*

GLEANINGS.

The Board of Agriculture at British Guiana has 'decided to import two thorough-bred hunters to improve the breed of horses in the colony.'

The *Southern Planter* recommends painting the inside of nest boxes with crude carbolic acid as means of keeping away lice from setting hens.

Mr. H. Millen, the Curator of the Botanic Station at Tobago informs us that several planters in that island are cultivating cotton, and that several shipments have been made to Trinidad.

Alfred Boon and Gerald Branch from the lately established Grammar School at St. Kitt's have passed the Cambridge Local Examination. We hope shortly to hear of similar success by boys from the Agricultural side of this school.

Mr. Alfred James Shepheard, a Barbados proprietor and a prominent member of the West India Committee, who is also Chairman of the Technical Board of the London County Council, recently stated 'that to endeavour to cultivate plants with only practical knowledge was like attempting to cure the sick after the fashion of a quack doctor without having mastered the science of medicine.'

The planters in Trinidad have evidently had enough of the mungoose. At first 1*s.* per head was offered for its destruction. Now it has become scarcer it is proposed to offer 5*s.* per head. A correspondent writes: 'We could do with fewer mungoose at Barbados and Antigua and other parts of the West Indies. They have long ago ceased to kill rats and are devoting their attention to destroying poultry, ground doves, lizards, bull-frogs and other animals we can ill spare unless we are prepared to bring on ourselves an overwhelming attack of insect pests.'

Alluding to the extension of rubber cultivation in East Africa, the *Indian Rubber World* of April 1, states that the Deutsch Ostrafrikanische Plantagengesellschaft, on their plantation at Lewa in German East Africa, have at the present moment upwards of 250,000 rubber trees under cultivation. The species grown is the Ceara rubber (*Manihot Glaziovii*). Four thousand five-year old trees were recently tapped and yielded about ¼ ℔. of latex each, of which it was estimated about 30 per cent. in weight was lost in drying. A yield of 700 ℔. of rubber was obtained from the 4,000 trees and, considering their age, the result is regarded as encouraging.

We regret to learn that a good deal of destruction of wood doves and ground doves is going on at Barbados. Before long it is not unlikely that the interesting little ground dove, at all events, will entirely disappear.

Balata, a kind of gutta percha obtained from the bullet-wood tree found in the forests of South America and in some parts of Trinidad, is in increasing demand. We learn that a further supply of 12,000 ℔. was lately received at Georgetown, British Guiana, from Venezuelan territory.

Professor Paul Ehrlich, of the Royal Institute for Experimental Therapeutics at Frankfort-on-Main, Germany, is engaged in an investigation of the poisons of animals. He is desirous of obtaining the poisons of snakes, scorpions, centipedes, spiders and other animals obtainable in the West Indies.

In the cool, moist districts of Grenada the Navette grass (Gamelette of Trinidad) is a common weed. The leaves somewhat resemble those of certain kinds of palms. It is a useful fodder, especially when long spells of dry weather set in. It is scientifically known as *Panicum palmifolium*.

With the object of encouraging cattle breeding in Jamaica, Sir Alfred Jones, K.C.M.G., on behalf of the Elder Dempster Company, has recently presented several polled Angus bulls to that island. The Agricultural Society assisted by the local Government has also, since its inception in 1895, greatly contributed towards improving the local breeds of horses, asses, cattle and small stock.

Attention was drawn in a previous issue of this journal to the market value of castor oil seeds. This was stated to be at the present moment at the rate of 8*s.* 6*d.* per cwt. As the plant thrives on poor soils and is estimated under ordinary conditions to yield about 40 cwt. of seed per acre, the industry is one which might possibly commend itself to planters in the West Indies who have large stretches of indifferent land which cannot be profitably utilized for other crops.

Cotton-growing in the West Indies is evidently exciting a good deal of interest in the United Kingdom. The subject was discussed at a meeting of the West India Committee on April 2 and the following resolution was passed unanimously :—

> 'The West India Committee desires to record its appreciation of the work being done by the Imperial Department of Agriculture and the British Cotton Growing Association in endeavouring to establish a cotton industry in the West Indies, and expresses a hope for the success of the experiments now being conducted in that direction.'

A creditable instance of successful efforts in the cultivation of a school garden plot is recorded in the case of Vincent Goring, one of the pupils of the Agricultural School at St. Lucia, at the Agricultural Show held in that island on March 27 last. Out of twenty-nine prizes, of the aggregate value of £3 6*s.* 6*d.*, Goring secured six prizes (five first and one second) of the total value of £1. This boy is said, besides having given liberally to his friends, to have netted upwards of 21*s.* during last year from the sale of vegetables out of a garden plot of only 300 feet square.

USES OF THE DIFFERENT VARIETIES OF TOBACCO.

The following information, taken from a leaflet published by the Bureau of Plant Industry (United States Department of Agriculture), may be of interest to agriculturists in the West Indies who are taking up the cultivation of tobacco:—

Florida Sumatra tobacco is used almost exclusively as a wrapper for domestic cigars. In the southern districts the thick or broken leaves may be cured for filler purposes.

Florida Cuban is essentially a filler tobacco for domestic cigars, although much desirable wrapper is produced from this type in the southern districts.

Connecticut Havana is grown entirely for wrapper and binder purposes for domestic cigars.

Ohio Zimmer Spanish is used exclusively for filler for domestic cigars.

North Carolina, Bright Yellow, is used for pipe smoking, chewing and cigarettes. The most valuable leaves are those for wrappers for plug tobacco and for all tobacco cigarettes. This type was formerly grown almost wholly for the domestic market, but now a considerable export trade is maintained with England, Japan and other countries.

Maryland smoking tobacco was formerly used to a large extent for domestic pipe smoking, but the principal market is in two or three of the 'Regie' countries, France taking the bulk of the crop.

The Tennessee types are principally exported.

The Virginia types are used to a very large extent in the domestic markets for smoking and chewing tobaccos and snuff. Considerable quantities, however, are exported, especially the heavier and cheaper grades.

Kentucky White Burley is used for pipe smoking, chewing and cigarettes. The bulk of the crop is consumed in our domestic markets, but considerable quantities are exported

A DATE LEAF BOAT OF ARABIA.

In the *Botanical Gazette* (Vol. xxxiv., p. 451) Mr. D. G. Fairchild, Agricultural Explorer of the United States Department of Agriculture, gives an interesting account of some small craft made from date palm leaves, and used on the coast of Arabia where wood is extremely scarce:—

They are made of the midribs of the date palm leaves, which are about an inch and a half in diameter and 10 feet long. These tough midribs, from which the leaflets have been removed, are fastened together by means of wooden pegs and strong twine in the form of a boat. No attempt is made to match joints, but a false bottom is built to the craft, and the mass of light midrib that lies beneath this bottom buoys the boat up out of the water so that the inside remains quite dry. Though in the form of a boat, this curious date leaf affair is really a boat-shaped raft, for nothing but the fact that the bottom stands high out of the water prevents the waves from entering and flooding it. They are not pitched or painted in any way, and would doubtless be short-lived were they not dried carefully on the beach whenever the owner is not using them. The paddles are the only parts of the boat which are not made of the date palm, being crooked, irregular poles with the sides of some dry goods box for blades. They indicate the remarkable dearth of wood in the region. They are weird little craft, and add one more use to the list of things which can be made from this desert palm.

CORN AND PEAS IN THE WEST INDIES.

The following useful hints in regard to the cultivation of Indian corn and peas and beans are taken from the *Journal of the Jamaica Agricultural Society*, for April, p. 136:—

These two crops go naturally together and suit our conditions well. Where hand cultivation only is given the corn may be planted 4 feet by 3 feet, or even a foot closer in dry districts and 'red peas' planted in the 3 feet spaces, with 'Black Eye' peas in the 4 feet row spaces. For cultivation by implements 4 to 6 feet by 2 is more suitable. The best yielder among field peas is the 'Wonderful' cowpea. This used to be looked at askance by people for table purposes, but it is now becoming quite common, and is being used for eating. The stores still hold by the 'Black Eye,' and will not stock the 'Wonderful' which is of brown colour. The 'red peas' will be ripe to take off in seven or eight weeks, well before the cowpeas or corn have made full growth.

An acre will give a crop of 20,000 ℔. of green pea vines, and these will draw from the air and store in forage about £3 worth of nitrogen if grown for fodder. If the peas are picked, and the vines allowed to dry, and then, after the corn crop is off, cattle or horse stock are allowed to feed down the corn stalks and what remains of the pea-vines, the beasts are well fed, the land is enriched by the droppings of the animals, and if ploughed, these and the pea-vine roots may be calculated as worth £3 per acre in manurial value. A root crop should follow, and those who aim at planting Irish potatos next November should look forward and plant a crop now of corn and peas, to be followed by the potatos. Planted between March 15 and April 15 the corn will be off in August. Horses and cattle can occupy the land in September, the soil should be broken up in October, and the potatos planted before the middle of November. For an exhausting crop like ginger, however, no root crop should follow corn and peas, but a second and thick crop of peas alone should be planted in November instead, and pigs turned on to rout over the soil after the peas are picked in February and March. The soil should then be well turned over and manured. Indeed, with the feeding of the live stock on the corn stalks and pea-vines in September and October, the turning in of the manure and waste with the remains of the roots and vines of the second crop of peas, together with the droppings of the pigs and the effects of their routing, the soil would not only be rich and strong but also in good tilth requiring only light ploughing and smoothing over and little fineing to be ready for a crop. As there is little virgin land left for ginger growing and it is not desirable to massacre the little remaining forest for that crop in any case, the only way of securing good crops of good quality is by a system of rotation and manuring such as sketched.

Cassava Cakes. There is evidently a keen demand in the United States for the thin, toothsome, cassava cakes so well known in the West Indies. At Boston and elsewhere cassava cakes from Jamaica have become quite fashionable for afternoon tea, but it is complained that the supply is limited. It only requires energy and organization on the part of some one in the West Indies to establish a regular industry in these cakes. It is suggested they might be put up in tins like 'Bath Olivers,' or, perhaps, neat, light, wooden boxes would do. They might then be shipped to accredited agents in Boston, New York and Philadelphia.

BIRD NOTES.

Barbados Blackbird.

The following interesting note on the Barbados blackbird is extracted from an article by the Rev. Canon Bindley on 'Some Oddities of Bird Behaviour in the West Indies' that appeared in the *Pilot*, in 1891:—

> A more comical but less confiding bird than the sparrow is the so-called blackbird *(Quiscalus fortirostris)*. It is, indeed well named, for it is black all over from beak to toe, but in appearance it resembles the English starling more than the blackbird. Of its various antics, quaint convulsions, and strangely curious notes, it is impossible to convey an adequate notion on paper. They must be seen and heard to be thoroughly enjoyed. Indeed, it sometimes seems as if their grotesque actions were performed solely with a view to the amusement of the onlooker. Their sleek, attenuated figures, dapper and dainty, sometimes convince one that they must be encased in diminutive stays, when suddenly, for no apparent reason, the feathers will all be erected, the tail spread out heavenwards, the head poked forward, and some notes will be ejaculated which are capable of various interpretations. To the negro on Saturdays the bird appears to say 'Have you got your pay?' To myself, when sowing vegetable seeds in the garden, the phrase becomes 'Is it worth your while,' conscious as I am of the fact that, as soon as my back is turned, the irritating creature will investigate the rows with his inquisitive beak. To the West Indian generally, who is not guilty of precipitancy of action in a climate 'where it is always afternoon,' the bird utters the reassuring statement 'We shan't be long!' This ambitious attempt at syllabic utterance is varied by a rough, harsh 'cluck' which is generally, I believe, a note of warning; and to hear it rapidly repeated by a flock of fifty or sixty birds, should a cat suddenly appear round a corner, is for all the world like listening to the winding apparatus of a large clock.

CANADA AND THE WEST INDIES.

The desirability of bringing about closer business relations between the West Indies and the Dominion of Canada has already been advocated in the pages of this journal. Referring to this important question the Jamaica *Gleaner* of March 21 last states:—

> In view of the desirability of developing the trade between Canada and the West Indies as much as possible, it is hoped that every encouragement will be given to the views of Dr. Morris regarding the exhibition of local products at the Dominion annual fairs. Dr. Morris has been on the spot and has seen for himself the necessity for providing the Canadian commercial firms with accurate information about West Indian products. The matter is related to the effort being made by this Government to stimulate trade between the two countries, and no doubt Mr. Olivier's forthcoming visit to the Dominion will result in something practical being done, which will enhance the value of the exhibits that may be made.

THE INTRODUCTION OF GAMBIER PLANTS INTO THE WEST INDIES.

Gambier is a valuable tanning substance prepared from the leaves of a plant largely cultivated in the Straits Settlements.* In the *Kew Bulletin*, 1891, pp. 109-10, there is an account by Dr. Morris of the first introduction of the Gambier plant into the West Indies in November 1891. The following is an extract from the *Kew Bulletin* reprinted in the *West Indian Bulletin* (Vol. IV, p. 80):—

> The present attempt to introduce the cultivation of gambier into the West Indies is a fact of some interest. It was only possible to arrive, thus far, in the matter, after several years of persistent effort. The gambier industry had hitherto been entirely confined to the East Indies, but owing to the increased demand due to American consumption, and the deterioration in quality which had obtained of late years, it was felt desirable to extend its culture to other parts of the tropics. The effort made to place these plants at the disposal of those who may be inclined to cultivate them in the West India islands is only a part of the general policy pursued at Kew for many years. The plants, in the first instance, were proposed to be entrusted to the botanical establishments in the West Indies to be propagated and distributed.
>
> The *Atrato* arrived at Barbados on the morning of November 24. The cases for St. Vincent and Trinidad were transhipped on board the *Eden*; the case for Demerara was transhipped to the *Esk*: the case for Dominica was transhipped to the *Solent*; while the cases for Jamaica remained on the *Atrato*, to go on direct to Kingston. The cases that were transhipped were carefully handled under the supervision of Mr. [now Commander] Owen, the chief officer of the *Atrato*, and my personal thanks are due to Captain Brander and to this officer for the great interest they took in this valuable consignment of plants, and for the facilities afforded for their careful treatment during the voyage.
>
> The reports received respecting the gambier plants on arriving at their destination were as follows:— *Jamaica, December 1:* 'Thirty-four plants in good order, eight in fair order, thirty-eight somewhat weak;' *British Guiana, December 3:* 'The plants arrived safely, all living;' *Trinidad, December 17:* 'All the plants arrived safely, the lower portion growing freely:' *St. Vincent, December 19:* 'Fifteen plants in good order, seven leafless, ten dead'—these plants were overcarried by the *Esk* to Trinidad and La Guayra, and returned to St. Vincent ten days late; *Dominica, November 28:* 'The plants arrived in good condition.'

Unfortunately the attempt to introduce Gambier into the West Indies has not been a success. In Trinidad the plants, although they have produced flowers, have never set seed: in Dominica also no seed has been produced: in British Guiana one plant only, which was tried in the forest region of the interior, has flourished.

The Barbados Ground Lizard. One of these large lizards was recently seen near the office of the Imperial Department of Agriculture. Its occurrence, so near Bridgetown, is of interest, as the ground lizard is one of the useful animals which had been almost exterminated by the mungoose.

---

* Uncaria Gambier, *Roxb.*

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—April 14, 1903.—Messrs. A. E. DE PASS & Co., Messrs. J. HALES CAIRD & Co., 'The GARDENERS' CHRONICLE,' April 11, 1903, and 'THE PUBLIC LEDGER,' April 4, 1903.

ALOES—Curaçoa, 14/6 to 40/-; Barbados, 13/- to 35/- per cwt.
ARROWROOT—St. Vincent, 2*d.* to 2$\frac{1}{4}$*d.* per lb.
BEES-WAX—Jamaica, £8 5*s.* per cwt.
CACAO—T'dad, 58/- to 67/6 per cwt. ; Jamaica, 50/- to 55/- per cwt. ; Grenada, 54/6 to 63/6 per cwt. ; Dominica, 52/- to 56/6 per cwt.
CARDAMOMS—Mysore, 1/4 to 4/- per lb.
COFFEE—Jamaica, 28/- to 56/- per cwt.
COTTON—West Indian, 5$\frac{3}{8}$*d.* to 5$\frac{3}{4}$*d.* per lb.
FRUIT—
  BANANAS—8/- to 12/- per bunch.
  ORANGES—9/- to 14/- per case.
  PINES—3/- to 4/- each.
FUSTIC—£4 15*s.* per ton. (Prices unchanged.)
GINGER—39/- to 62/6 per cwt.
HONEY—Jamaica, 22/- to 23/- per cwt.
KOLA NUTS—1*d.* to 4*d.* per lb.
LIME JUICE—Raw, 11*d.* to 1/6 per gallon. Concentrated, £15 per pipe.
LOGWOOD—£4 10*s.* to £4 15*s.* per ton. (Prices unchanged).
MACE—1/10 to 2/- per ℔.
NITRATE OF SODA—Agricultural, £9 5*s.* per ton.
NUTMEGS—70'*s*, 1/6 ; 95'*s*, 1/1 per ℔.
PIMENTO—2$\frac{1}{4}$*d.* to 2$\frac{5}{8}$*d.* per lb.
RUM—Demerara, 6*d.* to 10*d.* per proof gallon. Jamaica, 1/3 to 6/- per proof gallon.
SUGAR—Muscovado, 10/6 to 12/-, Crystallized, 14/- to 16/3 per cwt.
SULPHATE OF AMMONIA—£13 10*s.* per ton.

Halifax, N.S.,—'The MARITIME MERCHANT,' March 12, 1903.

MOLASSES—Barbados, 20c. per gallon. Packages not included.
ORANGES—Jamaica. (No quotations).
BANANAS—$2.00 to $2.25 per bunch.

New York,—April 17, 1903.—Messrs. GILLESPIE BROS. & Co. 'AMERICAN GARDENING,' March 28, 1903.

BANANAS—Jamaica firsts, $1.20 ; eight hands, 90c. per bunch.
CACAO—African, 12$\frac{1}{4}$c. to 12$\frac{1}{2}$c. ; Caracas, 13c. to 13$\frac{3}{4}$c. ; Jamaica, 10$\frac{3}{4}$c. to 11$\frac{1}{2}$c. ; Grenada, 11$\frac{1}{2}$c. to 12$\frac{1}{4}$c. ; Trinidad, 12$\frac{1}{4}$c. to 13c. per ℔.
COCOA-NUTS—Trinidads, $17.00 to $18.00 ; Jamaicas, $18.00 to $20.00 per M.
COFFEE—Rio, good ordinary 5$\frac{1}{4}$c. ; Jamaica, fair to good ordinary 5$\frac{1}{2}$c. to 6$\frac{1}{4}$c. per ℔. ; Manchester grades 8c. to 10$\frac{1}{2}$c. per ℔.
GINGER—Jamaica, 7$\frac{1}{2}$c. to 8c$\frac{1}{4}$. per ℔.
ONIONS—Bermuda, $3.00 per crate ; Havanna, $2.50 per crate.
PIMENTO—4$\frac{1}{2}$c. to 4$\frac{3}{4}$c. per lb.
RUBBER—Nicaragua scrap, 67c. to 68c. per lb. Guayaquil strip, 62c. to 63c.
SUGAR—Muscovado, 89°, 3$\frac{1}{16}$c. per lb. ; Centrifugals, 96°, 3$\frac{1}{2}$c. ; Molasses, 89°, 2$\frac{7}{8}$c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—April 22, 1903.—Messrs. GEO. W. BENNETT BRYSON & Co., Ltd.

MOLASSES—20c. to 22c. per gallon, package included.
SUGAR—$1.40 to $1.45 per 100 ℔.

Barbados,—April 25, 1903.—Messrs. T. S. GARRAWAY & Co. and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $4.00 per 100 lb.
CACAO—$12.00 to $12.50 per 100 ℔.
COFFEE—Jamaica and ordinary Rio, $8.00 to $8.50 per 100 ℔.
HAY—New Brunswick, 85c. per 100 lb.
MANURES—Nitrate of Soda $65.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $80.00 ; Sulphate of Potash $67.00 per ton.
MOLASSES—18c. per gallon, and $4.00 for puncheon.
ONIONS—Bermuda, $2.21, Antigua, $2.50 per 100 ℔.
POTATOS, ENGLISH—$3.00 per 100 lb.
RICE—Ballam, $4.60 per bag (190 ℔.) ; Patna, $3.50 per 100 ℔. ; Rangoon, $2.60 per 100 lb.
SUGAR—In hogsheads $1.35 per 100 ℔., and $5.00 for hhd. In bags $1.55 per 100 lb.

British Guiana,—April 23, 1903.—Messrs. WEITING & RICHTER.

ARROWROOT—St. Vincent, $8.50 to $9.00 per barrel.
CACAO—Native, 11c. to 12c. per lb.
CASSAVA STARCH—$7.00 per barrel.
COCOA-NUTS—$8.00 to $10.00 per M.
COFFEE—Rio and Jamaica, 11c. to 12c. per lb. (retail.)
  —Creole, 11c. to 12c. per lb.
Dhal,—$3.75 per bag of 168 ℔.
EDDOES—$1.20 per barrel.
MOLASSES—Vacuum Pan, yellow, 16c. per gallon, casks included.
ONIONS—5c. to 6c. ; Garlic 8c. to 9c. per lb.
PEA NUTS—Curaçoa, 3$\frac{3}{4}$c. ; American, 5c. per lb. (retail).
PIGS—Young Boars and Sows, $5.00 each.
PLANTAINS—20c. to 40c. per bunch.
POTATOS, ENGLISH—$3.50 per barrel.
RICE—Ballam, $4.70 ex store ; Patna and Seeta, $5.60 to $5.90 per bag.
  Creole Rice, 20c. per gallon (retail).
SWEET POTATOS—Barbados, $1.08 per barrel.
TANNIAS—$1.44 per bag.
YAMS—$1.92 per bag.
SUGAR—Dark Crystals, $1.82 to $1.90 ; Yellow, $2.40 to $2.50 ; Molasses, $1.80 to $1.90 per cwt.
TIMBER—Greenheart 32c. to 55c. per cubic foot.
WALLABA SHINGLES—$3.00 to $5.00 per M.

Trinidad,—Messrs. EDGAR TRIPP & Co., April 23, and Messrs. GORDON GRANT & Co., April 22, 1903.

BALATA—40c. to 41c. per lb.
CACAO—Ordinary, $12.25 to $12.50 ; Estates, $12.75 to $13.00 per fanega.
COFFEE—6$\frac{1}{2}$c. to 6$\frac{3}{4}$c. per lb.
ONIONS—$4.00 to $4.25 per 100 lb.
POTATOS, ENGLISH—$1.60 to $1.80 per 100 lb.
RICE—Yellow, $4.25 to $4.35 ; White Table, $5.25 to $6.00 per bag.
SUGAR—Yellow Crystals for local consumption, $2.25 to $2.40 per 100 ℔.
  —Molasses sugar, $1.75 to $2.00 per 100 ℔.

THE BEST MANURES FOR COLONIAL USE

ARE

Ohlendorff's Dissolved Peruvian Guano—For Sugar-cane and general use

Ohlendorff's Special Sugar-cane Manure

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Sulphate of Ammonia, Nitrate of Soda, Superphosphates, high grades, Potash Salts, Basic Slag and all other high-class Fertilizers.

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Barbados Agents: Messrs. James A. Lynch & Co., Bridgetown.

[33.]

"CACAO."

BY

J. H. HART, F.L.S.

NEW EDITION.

A TREATISE ON THE CULTIVATION, CURING AND CHEMISTRY OF

COMMERCIAL CACAO.

DAVIDSON & TODD, Trinidad.
Wm. WESLEY & Co., 28, Essex St., London.

Price 3*s.* per copy.

[50.]

NEW SEEDLING CANE.

(COLLYNNS SEEDLING).

For Sale, Top Plants. 25 cents per 100.

Analysis of Juice by Professor d'Albuquerque:—

Specific gravity	1·0853
Saccharose lb. per gallon	2·091
Glucose lb. per gallon	·048
Solids not Sugar	·184
Quotient of Purity...	90·01
Glucose ratio	2·29

RESULTS OBTAINED ON ESTATE.

30 clumps weighed 1,610 lb.
Equal to, per acre, (5x5) 41·75 tons.

30 clumps gave 112 gallons juice.
Equal to, per acre, (5x5) 6,500 gallons.

Very Strong, Large Grain Sugar obtained in Boiling House.

The Cane possesses a very hard rind and parts readily with its dry leaves.

Germinates Freely:
Ratoons Vigorously.

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Collynns, St. Lucy,
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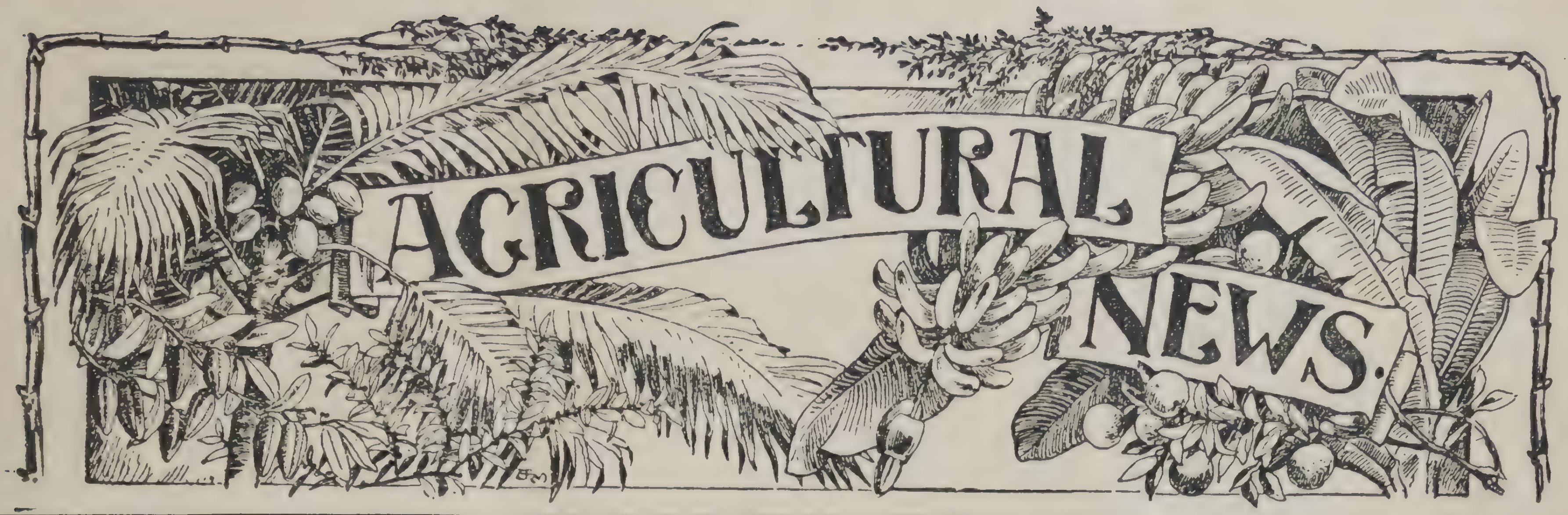

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Root-borer.

IN a recent issue the Barbados *Advocate* states that one of the most interesting papers in the current issue of the *West Indian Bulletin* is that by the Rev. N. B. Watson, Vicar of St. Martin's, on the root-borer of the sugar-cane. For some time there has been an idea that the white grub often found at the bottom of a cane stump was the 'lady bird,' but to Mr. Watson belongs the credit of establishing its identity.

Owing to the fact that the grub's life of 312 days underground is not commensurate with that of the sugar-cane, and that it does not feed on decaying vegetable matter, the close of the reaping season would be a bar to its further development, were it not that it is capable of adapting itself to other fare. As an illustration, Mr. Watson refers to the large percentage of dead and dying plants, so noticeable in the fields of ground nut and sweet potato planted during the first week of June 1902. An examination made at the time disclosed that, in every instance, the underground stem of the dead plant had been attacked at its lowest extremity by the root-borer and eaten from below upwards. Mr. Watson also points out that fields not under cane in 1901, and at some distance from fields that had been, were practically free from the ravages of root-borer during the months of June, July and August, 1902.

The root-borer, Mr. Watson says, might have been regarded as of comparative insignificance until within the last two or three years. Prior to 1901 its attacks were but little noticed, but since that date its numbers have increased to a great extent and its ravages are more apparent. The existence of the pest, it has been pointed out, has been made easy by cultivating, in infested fields, plants from which it derives food. But its rapid increase, Mr. Watson declares,—and the increase of most insect pests in Barbados—is to be traced to the mungoose. This animal, it will be remembered, was introduced into the colony to destroy rats, and for years it was protected by law. Anyone killing a mungoose was subject to heavy penalties. But rats seem to have palled on the appetite of the mungoose after a time. At any rate it did not confine its diet to them. It soon became a terror to the peasantry who went in for raising feathered stock; and, incidentally, it turned its attention to those reptiles and birds that kept the insect pests of the island in subjection. The ground lizard is believed to have fed principally on the root-borer; hence it was to be regarded as a valuable ally to the planter. But the mungoose regards this lizard as a great delicacy, and has almost exterminated it.

Amongst remedial measures pointed to are the use of lime and the alternation of crops which do not supply the grub with food. Its favourite plants are sugar-cane, sweet potato, imphee, ground nut and Guinea corn. None of these should immediately succeed each other, unless lime has been forked into the field. It is unwise to plant canes in a field that contained sweet potatos during August and September, which is the egg-laying period. Another check on the increase of the pest would be the removal of stumps from infected fields as soon as the canes are reaped. The grubs will live without food from twelve to fifteen days in moist earth, and about five days in dry earth. Ochro, cassava, yams, eddoes, woolly pyrol, pigeon pea, bonavist, rouncival and beans, are among the plants that do not appear to be subject to the attack of the grub.

In concluding his paper Mr. Watson says:—'The above suggestions aim principally at checking the increase of root-borer by cutting off its food supply either in the earlier stages of its growth, or during the later period of its larval existence. The use of lime has also been suggested as a direct means for the actual destruction of this pest, but, after all, its complete control must depend on the re-adjustment of our fauna, which will at once displace the exotic mungoose, and restore to the predaceous reptiles and insectivorous birds of Barbados that place and protection which nature assigned them.'

Dressing for Horses. The following simple treatment for galls and sores on horses is strongly recommended in the *Sugar Planters' Journal*: 'Use one part pure oxide of zinc to about 12 to 14 parts of vaseline. Mix well. A little melted, strained mutton tallow added improves it, but is not absolutely essential. Use for galls, sores, and all skin ailments of animals.'

SUGAR INDUSTRY.

Remedies for Root Disease of Sugar-cane.

An article dealing with root disease of the sugar-cane and describing the way in which the fungus (*Marasmius*) causes damage to the canes appeared in the *Agricultural News*, Vol. I., p 258. The following account of the methods which should be adopted in combating the disease should be taken as a continuation of that article:—

Properly speaking there are no remedies for root disease; that is, once a plant is attacked and the fungus is inside its tissues, we can do nothing to kill the invader.

Our methods for combating root disease must consequently be preventive; fortunately, if these be thoroughly carried out, they are sufficient to give us the upper hand of, if not entirely to stamp out, the disease.

The first point is to plant only those varieties of cane which are known to be best able to resist the attacks of fungi.

Secondly, to use for planting only canes that are thoroughly healthy and free from disease. Any plant that shows signs of the presence of disease should be at once rejected.

Again, the land should be well cultivated and drained. This is a double-edged weapon; the roots of the cane will be placed under more favourable conditions and so will be stronger and better able to withstand attack, while the fungus mycelium in the soil will be placed under less favourable conditions for its growth and so its attacks will be feebler.

Then rotation should be practised. When a field has been attacked, all the old stumps should be removed and burnt, the land well cultivated, and a rotation crop grown before re-planting in cane. In very bad cases more than one rotation crop is necessary. In this way the fungus is literally starved out.

Again, when the disease appears in a field an attempt should be made to isolate the diseased area and prevent the fungus spreading to plants that are still healthy. This can be done by digging a trench, a foot to eighteen inches deep, around the diseased area. The diseased plants themselves should, if possible, be well rooted up and every part burnt or destroyed in some way,—certainly they should not be simply thrown on to a compost heap to serve as fresh centres of disease wherever the compost is placed. In making the trench the soil should be thrown back on the diseased patch and not outside it. The soil of the diseased area should be thoroughly cultivated to allow free passage of air which is injurious to the fungus.

Then diseased canes should never be allowed to ratoon. To allow this is simply to give the fungus a permanent home whence it can spread to other, still healthy, plants.

Marasmius, the fungus causing the root disease referred to in this note, is very common this year in Barbados, many specimens have been sent in to the Department suffering from it. Unfortunately very little can be done now, but at the next planting season a determined effort should be made by planters, on the lines suggested above, to gain the upper hand of this pest.

South African Canes in Antigua.

The following account of canes imported into Antigua from Natal is taken from the *Antigua Standard* of May 2:—

In response to our request to be favoured with information as to the results of several specimens of canes imported from Natal a couple of years ago, we were courteously placed in possession of what will be read with interest by our planter friends. Mr. George J. Goodwin of Deurs, under date April 27, writes:—

'With reference to African canes reaped by me this year, I herewith give you all figures at my disposal. The "Green Natal," which is a Ribbon cane, very much like our "Red Ribbon," I find to be a good cane with excellent juice, and giving as much weight of good, stout, juicy cane as the "Mount Blanc" and "White Transparent" I had planted in the same field. I found that four rows of 225 feet each, equal to 4,500 feet, gave me 312 gallons of juice which would total about 3,020 gallons to the acre, and, at a yield of 1,360 gallons to the hogshead, would give about 2¼ hogsheads per acre, which is about the average yield per acre of the whole field, most of which is "Mount Blanc" and "White Transparent." I may here mention that we are now boiling our sugar very low in order to obtain a greater quantity of molasses, and that when we were boiling the sugar higher we only got little over 1,200 gallons to the hogshead, so that the "Green Natal," and in fact the whole field, would have given 2½ hogsheads to the acre if boiled to usual height, that is, the 3,020 gallons per acre mentioned, at, say, 1,028 gallons to the hogshead, would be equal to 2½ hogsheads per acre. The "Louzier," which is very similar to the old Bourbon, and which some people say is such, practically, I found on cutting four rows of 240 feet each, equal to 4,800 feet, to give me 304 gallons equal to 2,758 gallons to the acre, which under ordinary conditions would have given 2¼ hogsheads to the acre; but boiling so very low would at 1,360, our yield for the week, give very little over 2 hogsheads, or ¼ hogshead per acre below "Green Natal," "Mount Blanc" and "White Transparent." I found both "Green Natal" and "Louzier" good, sound canes, free from disease and milled easily. The only peculiarity I noticed was in the "Louzier," in which I found the ends of the leaves of the tops were nearly all dry and brown, and that its trash was very brown and decayed rapidly. I got samples of the juices tested, and enclose statement of results. I have planted cuttings of both canes in a nursery and have given cuttings to other friends who take an interest in the comparison of different sorts of cane.'

The following is an analysis of the juices of the "Green Natal" and "Louzier":—

	Green Natal.	Louzier.
Total solids	2·323 ℔. / gallon.	2·255 ℔. / gallon.
Sucrose	2.171 „ „	2.056 „ „
Glucose	0·025 „ „	0·049 „ „
Non-sugar	0·127 „ „	0·150 „ „
Glucose ratio ...	1·2 per cent.	2·4 per cent.
Purity	92·3 per cent.	91·1 per cent.
Sp. Gr....	1·0853	1·0827

Both these juices are good, the Green Natal being especially so, the glucose and non-sugar being low and the purity and sucrose high.

(Sgd.) H. A. TEMPANY,
Acting Government Analyst.

The Monocane Sugar Company.

We publish the following as likely to be of interest to the sugar planters in these colonies:—

A wish is often expressed that a central agency could be formed in London for the distribution and protection of West Indian products—protection from the foisting on the public of colourable imitations of the genuine West Indian articles. A company is now in existence which, to a large extent, serves these purposes. This is 'The Monocane Sugar Company, Limited,' with which many prominent West Indian merchants are connected. From a circular recently issued we learn that the company has been formed to promote the sale and consumption of the pure and wholesome cane sugars of the British West Indian colonies. Complaint is frequently made nowadays, the circular states, that it is most difficult to obtain the genuine West Indian cane sugars which were formerly on every table. The gradual substitution and increased consumption of dyed and inferior foreign beet sugars has been most detrimental to the people. The company seeks the support of the public on four grounds:—(1) The great sweetening power, and consequent economy, of cane sugar is known to every consumer. (2) Every housewife must admit the superiority of cane over beet sugar for all cooking and preserving purposes. (3) Medical opinion strongly urges the use of pure cane sugar as a means of health preservation. (4) The British public, in these days of Imperialism, will be willing to support an industry which has so long suffered from the unfair competition of foreign bounty-fed beet sugar, and which can claim their support for these two indisputable reasons—that it is both British and best. The Monocane Sugar Company, Limited, supply all kinds of cane sugar, neatly packed in boxes or bags, sealed with the company's label and trade mark. In addition to Barbados soft moist cane sugar, and Demerara crystallized cane, the company sell lump cane sugar, granulated cane sugar, toffee made with West Indian sugar, West Indian guava jelly, and West Indian honey. This company should prove an important agency in the furthering of the material interests of the West Indies, and is deserving of every support and encouragement. (Demerara *Argosy*).

COTTON PLANTING.

As the rainy season will soon be here, planters who intend to grow cotton should have their fields ready so as to sow as soon as the land has moisture enough. As sufficient data is not yet obtainable as to the best time to plant cotton in these colonies, or the best distance apart to grow the plants, it is desirable that those undertaking the cultivation should sow a portion of the area they intend planting in each month from, say, the end of May to the beginning of August. They should also sow a portion of each area at different distances apart in the rows and between the individual plants in the rows, afterwards keeping an accurate account, in each case, of the weight of seed-cotton obtained from each plot. By these means planters will, in a short time, ascertain the right time to plant cotton and the superficial area best suited to the soil and climatic conditions in the West Indies. It is suggested that not more than four feet between the rows and not more than two feet between the plants in the rows would be suitable distances for experiment purposes this year.

WEST INDIAN FRUIT

EXTENSION OF AMERICAN FRUIT MARKETS.

Experiments have recently been undertaken by the U.S. Department of Agriculture with the object of extending the export fruit trade of the United States. Several experimental shipments, including summer apples, peaches, fall pears and sweet potatos, have been made. 'The results so far obtained,' says the Honourable James Wilson in *Report* (No 73) for 1902, 'indicate that the first named products may be landed in European markets in good condition if proper care is exercised in all of the operations from the orchard or field to the final destinations. A net return has been realized equal to, and in most cases in excess of, domestic values. It is shown also that the net return for a given fruit is largely influenced by the kind of package in which it is forwarded and by the methods of packing and shipping it.'

Continuing, Mr. Wilson writes:—

'I wish here to point out the necessity, in work of this kind, for a thorough and systematic study of the different foreign markets, in order that the American farmer and fruit grower may act intelligently in making shipments. To this end a plan is being devised whereby an experienced man will be sent to one or more of our most promising foreign markets to study all the prevailing conditions, and to secure and handle experimental shipments of fruits and vegetables, noting the condition in which various shipments arrive, the methods of packing which give the most satisfactory results, and looking after numerous other details which can be determined in no other way. Such an agent would also be in a position to secure valuable facts regarding the products with which we are compelled to compete, and would be able to point out methods by means of which we could best meet this competition.

'To make this work still more valuable, the Department's agent or agents could do much toward enlightening the general public in such foreign countries in regard to the value of our products for general consumption. There is no reason why many of our fruits and vegetables cannot be sent abroad and sold at a price that would place them within the reach of the average consumer, provided he was aware that he could obtain them, and knew something of their value as food. In other words, it seems that the time has come for decisive action in the matter of exploiting abroad such products as have been mentioned, and, to accomplish this with the best results, trained men, and men of good judgement will be required. If sufficient funds are available, it is planned to inaugurate this work the forthcoming year in a limited way.'

The need of carefully studying foreign markets, with a view to discovering what to export to each country and how and when to export it, is a point the importance of which should be thoroughly realized by West Indian producers.

PINE-APPLES AT JAMAICA.

As showing the difficulty sometimes experienced in pine cultivation in the West Indies owing to the selection of an unsuitable locality and other causes, we quote the following from the *Jamaica Gleaner* of May 4:—

We learn that the United Fruit Company's experiment in pine growing at Gregory Park has not turned out the success it was anticipated. The plants have grown to an enormous size but will not fulfil the promise of a fine crop. It is stated that fully 50 per cent. of the plants are bearing 'cocks' combs' and many-headed pines. We understand that this generally happens when the soil is of an excessive richness and when there has been over fertilization.

It is said that the experiment has so far cost over £500. There is a belief, however, that the next crop will yield better results.

THE MANGO AND ALLIGATOR PEAR IN PORTO RICO.

In the *Annual Report* (No. 73) of the United States Department of Agriculture, referring to the increasing demand of good quality mangos and pears in the American market, and to the possibility of such demand being supplied by Porto Rico, the Hon'ble J. Wilson, the Secretary, writes:—

Reports are in preparation advising the extensive planting of superior varieties of mangos and alligator pears in Porto Rico, to supply the increasing demands of the markets of our Eastern cities. That these fruits are not already as popular in the United States as bananas and oranges is due to the fact that there has been no adequate or regular supply of good quality. Porto Rico offers natural conditions very favourable for their culture, and improved facilities of transportation have simplified the commercial problem. Varieties much superior to those now grown for home use in Porto Rico have been found by representatives of the Department in Guatemala and Mexico.

COTTON.

The West Indies and Cotton.

Under the above title a most interesting article, discussing the present and future supply and demands for cotton, appeared in *Our Western Empire* for April.

It is first pointed out that, while at one time Great Britain bought 70 per cent. of its cotton from the West Indies, the cultivation of cotton here has practically died out. The advantages that the raising of cotton possesses over fruit and cacao production, in the way of the immense and constantly increasing demand for cotton, are then emphasized. In this connexion it is mentioned that 'while during the last 100 years the consumption of flax has doubled and that of wool has increased five times, the consumption of cotton has been multiplied by thirty-nine.' Again, quoting from the *Yearbook* of the United States Department of Agriculture for 1901, it says: 'It therefore seems more than likely that the cotton industry will go on expanding until the whole of the inhabitants of the world are clothed with the product of its looms.'

Another point to which attention is drawn is the fact that, since 1898, the United States have been the largest cotton manufacturers in the world, and that, as their manufacturing industry develops, they will have less available for export.

The great suitability of the West Indian islands for cotton cultivation is next insisted upon, and mention is made of the efforts of Dr. Morris in actively promoting the resurrection of the industry, before the British Cotton Growers' Association had begun to move in the matter.

The experiments and efforts in cotton growing that have been made in the West Indies, most of which have already been described in the *Agricultural News*, are then summarized.

The article concludes as follows:—

'In the cultivation of cotton the West Indies may be said to have already made something of a start, about 500 acres in all being under cultivation, and, if the industry is energetically pushed, there is probably a good future before it.

'The fact must not be lost sight of that Sea Island cotton, which is indigenous in the West Indies, and can probably be grown there more successfully than in any part of the world, is a long staple cotton like Egyptian, and for these long staple cottons there has been, during the last few years, a steadily increasing demand; indeed, the Lancashire spinners are often at their wits' ends to know how to fill their orders. On the other hand, the growing tendency in America to build spinning houses close to the cotton fields is causing American cotton, even more and more, to stop at home. There is no substitute for cotton, as beet is for the cane. It is an article of every day use, and of necessity. The wealth of the Mother Country to a great extent depends on its supply. The West Indies have special qualifications for meeting the demand. Why not meet it?'

New Seedling Cane. A new seedling sugar-cane, raised by Mr. C. K. Gibbons, of Collynns plantation, Barbados, appears to be very promising. It is stated to have yielded at the rate of 42 tons of canes per acre. The yield of saccharose per gallon of juice is 2·106 ℔. The quotient of purity is exceptionally high, viz., 91·13. On the other hand, the glucose ratio is very low viz., 1·99. Mr. Gibbons adds that 'the cane possesses a very hard rind and parts readily with its dry leaves.' Top plants are offered by Mr. Gibbons at the rate of 25 cents per hundred.

HONEY IN THE UNITED KINGDOM.

In the *Pharmaceutical Journal* for November 1902, a paper on 'The Products of the Bee' by Mr. Samuel T. Frost, read before a meeting of the Chemists' Assistants' Association in October last, is concluded. The following extracts from the portion dealing with the importation of honey into the United Kingdom supply information which will be of interest to bee-keepers in the West Indies:—

The importation during the past five years has been roughly estimated at about 2,250,000 cwt., value about £31,000, or about $3\frac{1}{4}d.$ per ℔. Among the principal countries supplying the British markets are the United States of America—chiefly California—Chili and Peru, British West Indies, France, Italy, Australia and Germany. Occasionally honey is also imported from New Zealand.

California may be put first as a producer of honey, though the crop varies considerably, as will be seen from the following figures, which are the most recent I have been able to obtain:—In 1894 9,000,000℔ of honey were produced; the next year the crop fell to 3,000,000℔., rising in 1896 to 4,500,000℔. The honey crop in California, as in other countries less favoured in the matter of climate, depends to a great extent on the weather prevailing during the spring and summer months. But, with its opulence of bloom practically all the year round, that country is an ideal home for apiculture, as many as three crops of honey being available. . . . .

Chili probably ranks next to California as a honey producer, although the industry there is only about twenty-five years old. Good, thick, white Chilian honey is especially esteemed for medicinal purposes. Chilian and Peruvian honey and wax are much of the same class. The honey is packed in kegs of $1\frac{1}{2}$ to $1\frac{3}{4}$ cwt., sometimes a little more, sometimes less. The principal markets in Europe for Chilian honey are Hamburg and Liverpool, it being very rarely offered in London.

Jamaica honey has been in evidence in the London market of late years, and it has been one of the cheapest articles sold. Most of the modern improvements in bee-keeping having been adopted in Jamaica and Cuba with great success, the output has been considerably increased. In Cuba honey is said to be produced at a cost not exceeding two cents per ℔., very large yields being obtained.

'Extracted' honey is usually exported from the West Indies either in barrels or in clean kerosene tins, two 4-gallon tins being placed in a light box. Last year the shipments of honey to the United Kingdom were roughly estimated at 13,000 cwt., while this year's importations are expected to greatly exceed that amount. Hitherto Jamaica honey has been practically unknown to the British public, as it was not suited for table purposes, but, since the Jamaica Bee-keepers' Association has taken the matter in hand seriously, efforts are being made to improve the quality and appearance of the honey. A board of examiners has been appointed, and every package of honey sent by members of the Association for shipment is to be graded by the board on its merits and, if found to come up to the required standard, it will be branded with the Association's stamp.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 175 of this issue.

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Agricultural News

Vol. II. SATURDAY, MAY 23, 1903. No. 29.

NOTES AND COMMENTS.

Volcanic Ash in Cane Juice.

Consequent on the three falls of volcanic ash at Barbados, during the crop season of 1902, planters have experienced trouble in grinding their canes, owing to the fact that in some cases the canes have been coated with volcanic ash that had lodged in the axils of the leaves. The mill rollers have been polished to such an extent as to require re-chipping. Further, the juice has contained an appreciable amount of ash that had to be got rid of in the process of manufacture. Recently a sample of 'filter press cake' and 'filter press mud' was forwarded for examination to the Government Laboratory in order to determine whether its use was likely to be injurious to cattle. In the filter press cake Professor d'Albuquerque found 14·20 per cent. of volcanic dust; while in the filter press mud there was found 2·40 per cent. of volcanic dust. Professor d'Albuquerque adds: 'The mud and, therefore, the filter press cake contains a notable proportion of volcanic dust which, consisting in part of angular fragments is likely, when fed to cattle, to set up irritation in the walls of the alimentary canal. Whether on this account the use of this food auxiliary should be entirely discontinued, or simply diminished in proportion to other foods, is a question that can only be answered by careful observation of the effects when employed in varying quantities on the cattle themselves.'

Improvement of Stock at British Guiana.

Considerable attention is being given in British Guiana to improving the local breeds of horses, cattle and small stock. The Demerara *Argosy* of January 21 last, mentions that the Board of Agriculture in that colony had recently imported fourteen Plymouth Rock fowls (two cocks and twelve hens), while the *Daily Chronicle* of February 11 states, that there were landed from the s.s. *Spheroid* for Mr. W. D. McKinnon's stock farm in Berbice, ten coops of English prize-bred fowls, of various kinds, and a number of geese and turkeys. The same paper also alludes to the arrival by the Royal Mail Steamer from Grenada, consigned to other gentlemen in British Guiana, of two coops of fowls, five Berkshire hogs, seven cattle (consisting of half-bred Herefords and Zebus) and two half-bred fillies. The last mentioned were obtained at the annual sale of stock at Woodlands Stock Farm in Grenada and are the progeny of pure-bred imported animals.

The Trinidad Bulletin.

Among the many interesting notes contained in the issue of this journal for April 1903, is one referring to the Congo coffee *(Coffea robusta)* a species recently introduced. Mr. J. H. Hart, F.L.S., the editor, states, that 'this new coffee gave enough produce during February to warrant our preparing some for the table; the prepared coffee was placed in the hands of excellent judges, who, on tasting it, at once declared it to be of the best quality. The plant is very productive and it promises to become a first class coffee for lowland cultivation.' It is also recorded that from young trees of *Funtumia*, 4½ years old, excellent rubber resembling Para has recently been obtained. 'The rubber fluids of this tree readily coagulate *en masse* on subjecting them to the boiling process, and they contain a very high percentage of pure rubber, and fewer albuminoids than *Castilloa*. Trees 4½ years old are now 30 feet in height at the St. Clair Experiment Station, and are seeding freely. At the present everything appears to favour the belief that in *Funtumia* we have a much more profitable tree than we have in *Castilloa*, and one much more easily grown and worked.'

A New Remedy.

An East African remedy for blackwater fever and bilious remittent fever, described in the *Lancet* of February 1, 1902, is prepared from the root of *Cassia beareana*. According to Dr. O'Sullivan-Beare, Vice-Consul at Pemba, the remedy has proved of much value in several cases under his treatment and it is highly esteemed by the Fathers of the Catholic Mission in East Africa. A sample bottle of the fluid extract, presented to the Department by Messrs. Thomas Christy & Co., 10, Swan Lane, London, E.C., has been placed for trial in the hands of a leading member of the medical faculty in Barbados.

The Agricultural News.

It has been suggested that the mission of the *Agricultural News* is to help and encourage all classes of cultivators in the West Indies to pay greater attention to the mine of wealth which they possess in their rich and varied soils. Cultivators must, however, assist to work out their own salvation by recognizing the need of brain culture as a preliminary to practical work, and by uplifting agriculture as a profession so that it will attract the best intellects in the community.

◆

Cotton in French Soudan.

As indicating the keenness with which every new idea for the furtherance of tropical industries is taken up nowadays, we may mention that, following the example of the formation of the British Cotton Growing Association, we have now its French counterpart in *l'Association Cotonniere Coloniale.* This is formed for the purpose of encouraging the cultivation of cotton especially in certain parts of Western and Central Africa.

◆

Notes on Poultry.

With reference to the Pamphlet (No. 23) on the rearing and management of poultry in the West Indies, recently issued by the Imperial Department of Agriculture, Dr. C. J. Manning, of Barbados, writes as follows :—

> Mr. Barclay's notes on poultry are of great interest to me, as I am firmly of the opinion that poultry-raising is one of our most important minor industries but at present lying dormant, and entirely undeveloped. I have just sent away for four incubators from different firms, for friends of mine who will give me the result of their experience. I am at work on this question and will see what can be done. It is a strange coincidence that I had come to precisely the same conclusions as Mr. Barclay, viz., that heavily feathered fowls are no good for these islands.

◆

Oil of Akee.

An interesting article appears in the *Pharmaceutical Journal* of December 15, 1900, on oil prepared from the arillus or edible part attached to the akee seed. The akee seed is yielded by an African tree *(Blighia sapida)* common in Jamaica but little known elsewhere in the West Indies.

The oil is described as a 'yellow, non-drying, butter-like fat consisting of a liquid portion and a solid granular portion.' The following further particulars are quoted from the article above referred to:—

'Akee oil contains approximately about 50 per cent. of liquid glycerides, calculated as olein from the iodine value: about 40 per cent. of solid glycerides and about 10 per cent. of the free acids contained in these glycerides.

'The oil-cake consisting of the pressed seeds still contains 25 per cent. of oil, which can be extracted by solvents.'

Volcanic Dust in Barbados.

In the recent issue of the *West Indian Bulletin* (Vol. IV. No. I.) the results of a chemical analysis by Prof. J. P. d'Albuquerque of the dust fall of March 22, 1903, are given. It is interesting to compare this with the analysis of the dust of May 8, 1902 (*West Indian Bulletin*, Vol. III., p. 283).

In the first place the 'loss on ignition' is much greater in the more recent dust: in the dust of May 1902, this amounted to only 0·060 per cent., while in March 1903, it is 0·545. Again the amount of oxides of iron is much greater: in May 1902, the ferrous and ferric oxide together equalled 6·372 per cent.; in March 1903, the percentage is 14·16. There is a good deal more phosphoric anhydride in the more recent dust and rather less sulphuric anhydride. The March dust also contains more magnesia and considerably less alumina and potash than that of May 1902.

The mineralogical analysis by Dr. Longfield Smith shows that the same minerals are present in the two dusts, but that the proportions differ very considerably. The most striking feature of the last dust is the large amount of magnetite and hæmatite (oxides of iron) present.

In neither case did the dust possess any manurial value.

◆

New Fibre Plant in Cuba.

In a letter recently received from the distinguished botanist, Sir Joseph Dalton Hooker, G.C.S.I., C.B., F.R.S., formerly Director of the Royal Gardens, Kew, who takes the deepest interest in what is going on in the West Indies, he drew the attention of the Commissioner of Agriculture to the existence in Cuba of a wonderful fibre plant belonging to the Bowstring hemps *(Sanseviera).* It is larger than any other, as the leaves are 6 inches broad and 3 to 4 feet long.

It was imported into Cuba (possibly from West Africa) by a company that broke down from inefficient treatment of the plants. Probably the fibre is that alluded to amongst the textiles of the Paris Exhibition of 1900 as 'Langue de Vaca, *Sanseviera sp.*' A firm in London states that the fibre is sometimes imported and fetches £35 a ton.

The following is a description of the plant growing at Kew, figured and described in the *Botanical Magazine* of February, 1903:—

> *Sanseviera grandis*, J. D. Hooker, tab. 7877.—A supposed native of tropical Africa, but introduced into Cuba in the hope that the fibre it contains, which is of extraordinary strength, might be turned to commercial account. The plant is growing in the temperate house at Kew, and has a tuft of broad, obovate, oblong, acute leaves 3 to 4 feet long, 6 inches wide, pale green, with transverse stripes of a deeper colour, and a central stalked raceme, some 3 feet high, of numerous, regular, erect, funnel-shaped, greenish flowers, each about 2 inches long, the linear perianth segments as long or longer than the narrow tube.

INSECT NOTES.

Screw Worm in Jamaica.

Mr. W. R. Buttenshaw, M.A., B.Sc., the Lecturer in Agricultural Science at Jamaica, writes that comparatively few readers of the *Agricultural News* in Jamaica have realized that the screw worm is the pest that is so troublesome to Jamaica stock owners. (see *West Indian Bulletin*, Vol. III, p. 204).

Very few neglected wounds escape the attacks of 'the fly,' and the usual method of treatment adopted by the natives—who, by the way, have a strong faith in Jeyes' Fluid—is generally effective though somewhat crude. The worms are scraped out with a piece of straw and the wound washed with a strong solution of Jeyes'. A plug is then made of fresh horse dung and inserted into the wound.

Calomel is successfully employed on some estates, and this remedy might be added to the list given by Mr. Lefroy *(Screw Worm in St. Lucia*, pp. 9 and 10*)*.

Attacks on cattle are very common, not only as the result of wounds caused by barbed-wire scratches and by sharp horns, but also as the result of castration and undressed navels.

There can be no doubt that the importation of polled cattle is a move in the right direction, and one cannot help feeling that the Aberdeen Angus bulls are very desirable in this connexion on account of their great prepotency. It is stated that 75 to 90 per cent. of their calves from horned cows are polled.

Directions for Sending Insects.

The following, suggested by Dr. H. T. Fernald, is recommended to the attention of correspondents of the Department in the West Indies:—

All inquiries about insects, injurious or otherwise, should be accompanied by specimens, the more the better. Such specimens should be packed in some soft material as cotton or wool, and enclosed in a stout tin or wooden box. *Insects should never be enclosed loose in a letter.*

Whenever possible, larvæ (i.e. grubs caterpillars, maggots, etc.) should be packed alive, in some tight tin box—the tighter the better, as air holes are not needed—along with a supply of their appropriate food, sufficient to last them on their journey; otherwise they generally die on the road and shrivel up. Send as full an account as possible of the habits of the insect respecting which you desire information; for example, what plant or plants it infests; whether it destroys the leaves, the buds, the twigs, or the stem; how long it has been known to you; what amount of damage it has done, etc. Such particulars are often not only of high scientific interest, but of great practical importance.

GOATS' MILK.

The following extract affording useful information respecting goats' milk is taken from *The Book of the Dairy*, translated from the German of Dr. W. Fleischmann (London: Blackie & Son) pp. 53-55:—

In Germany, the milk of goats, with the exception of a very small proportion which is used in the manufacture of cheese, is directly consumed, and is used in the small dairying districts as a substitute for cows' milk. As it is admirably suited for this purpose, it appears desirable that as large an increase as possible in the use of goats' milk should take place, and this all the more because tuberculosis, a disease which is very widely spread among so many breeds of cows, and which is communicable to mankind, is unknown in goats. Goats' milk has a white colour, very often a slight yellowish tinge, a weak, characteristic smell and flavour, and a slightly slimy consistency. On an average it is richer in solids, especially in soluble nitrogenous substance (albumin), than cows' milk, and is less easily creamed. It would appear that the fatty globules are, on an average, somewhat smaller than those in cows' milk. The smell of the he-goat, which is common in goats' milk, is not a characteristic of the milk itself, but is peculiar to the skin of the goat and is imparted to the milk externally.

In the year 1883, 2,600,000 goats were kept in Germany, that is to say, they numbered 5·8 for every hundred inhabitants. Between the years 1873 and 1883 the number of goats kept increased by 13·8 per cent. It is a well-known fact that goats are characterized by a high milk yield. If we take the live weight of a goat at 30 kilos (66 ℔.), and the annual yield of milk at only 300 kilos (660 ℔.), it will appear that goats yield in milk, in one year, ten times their live weight. Animals with large milk-yielding capacities can, if well fed, yield annually 800 kilos (1,760 ℔.), or even more. Goats carry their young, on an average, about 154 days, and the lactation period is four to five months. The time of their milk-yielding period in the year is generally about six months, less frequently four months, and on occasion it may extend to ten months. So far as investigations have shown, goats' milk, on an average, has the following percentage composition:—

Water	85·5
Fat	4·8
Caseous matter	3·8
Albumin	1·2
Milk-sugar	4·0
Mineral matter	·7
	100·00
Total solids	14·5

The specific gravity varies between 1·0267 and 1·0380 and may be taken on an average as 1·033, at 15°C. It has already been noted that goats' milk, like cows' milk, always contains citric acid.

A short review of *The Book of the Dairy* has already appeared in the *Agricultural News* (Vol. II, p. 155).

SUGAR-CANES IN ARROW.

The season of 1902 was on the whole an average one for the production of arrows at Barbados. In some instances, however, where the White Transparent cane, a freely flowering variety, was planted in October or November of the previous year, the fields were covered with masses of handsome, light, reddish-brown panicles of tiny flowers making, in conjunction with the bright green leaves of the stem, a striking picture seen waving in the tropical breezes. To a stranger, visiting Barbados for the first time, the nodding plumes of field after field of sugar-canes, extending as far as the eye can see, make, with the cloud shadows as they pass athwart the landscape, a scene not readily forgotten. To the stranger the sight is one of unmixed pleasure. To the planter who wonders how much of the manure he has applied to his fields, in the hope of filling his hogsheads, has been absorbed in the production of the fine display of waving plumes, the scene may be one of disappointment and hope deferred. To those who are mainly interested in the production of new seedling canes, the many flowers promise a rich harvest of fertile seeds. The last, however, have an anxious time, as great care is necessary to gather the panicles at the right time. To cut them too soon is to court failure through the loss of germinating power: to delay too long is to see the spikelets and seed carried away on the breeze.

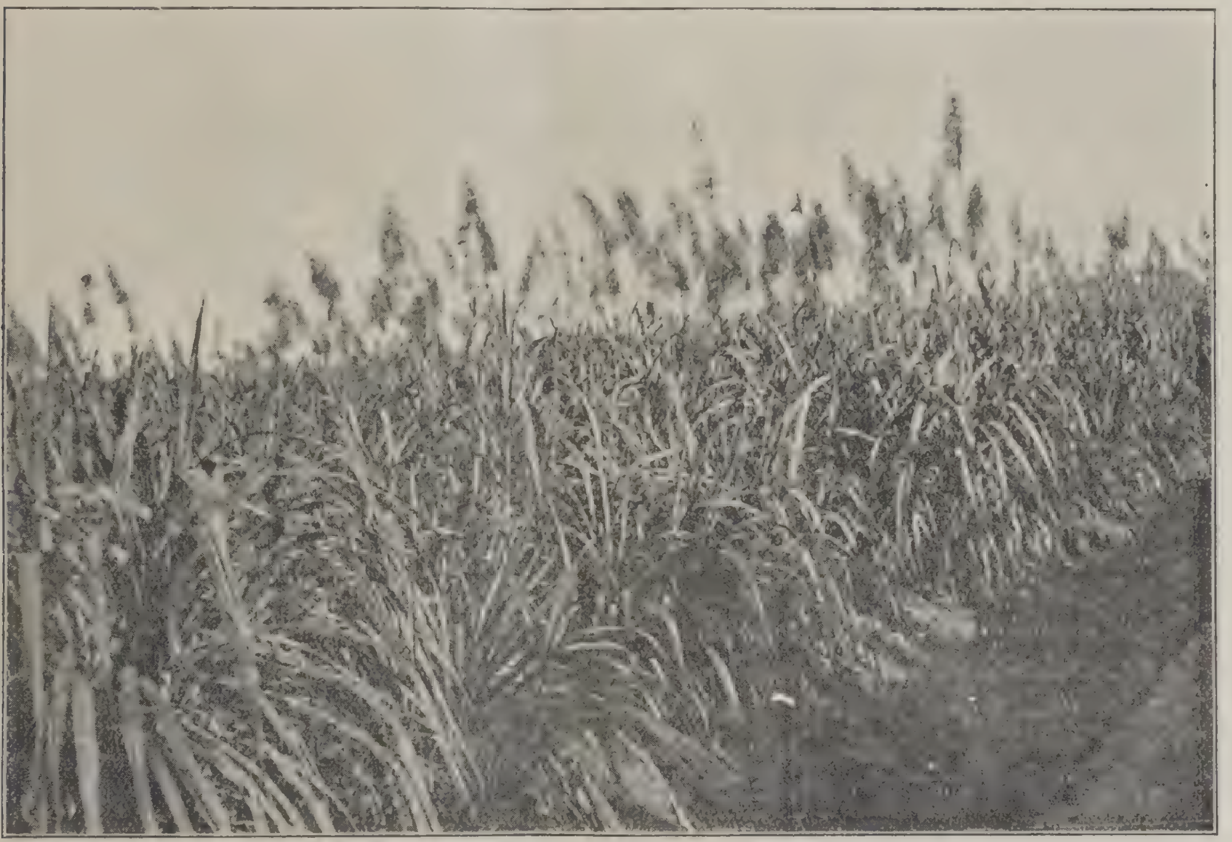


Fig. 12. Sugar-canes in Arrow at Barbados, December 1902.

[*From a photograph taken by Lady Hodgson.*]

Although sugar-canes in some of the West Indian islands, British Guiana and Java have been only systematically grown from seed for the past fifteen years, self-sown seedlings were known to exist many years before. In February 1859, Mr. J. W. Parris, C.M.G., one of the present veteran planters of Barbados, in a letter to the *Liberal* newspaper, recorded the fact of his having seven self-sown seedlings growing on his estate. Now many thousand seedlings are grown annually in some of the cane sugar producing countries of the world, and at the present time very satisfactory yields are recorded from the best of these canes.

LEGUMINOUS FORAGE CROPS.

The following extract from *Report No. 73*, U. S. Department of Agriculture, 1902, shows the efforts that are being put forward to discover and establish a leguminous plant as a substitute for clover in the United States and the value attached to leguminous crops by American agriculturists:—

The influence of leguminous forage crops in restoring fertility to the soil is well known. No system of agriculture can be indefinitely maintained without some crops of this character. From the earliest times clover has been the foundation of agriculture in our Northern States. But with each succeeding year the difficulty of securing a stand for this important crop increases, and there is a pressing demand for a suitable substitute for clover. The Department has undertaken to meet this demand by the introduction of alfalfa in the clover region. The success which has thus far attended our efforts in this direction is most encouraging. It has been demonstrated that alfalfa can be successfully grown in nearly all the Northern States. This work promises so much that we desire to push it vigorously during the coming year.

In our Southern States the cow pea is deservedly popular as a leguminous crop, both on account of its feeding value and its beneficial effect on the soil. But on account of its habit of growth this plant is difficult to harvest, either for hay or for seed. The Department has collected all known varieties of cow peas in order to study the characteristics of each. We have undertaken to produce varieties that shall be free from the objectionable characteristics of those now grown, and have reason to hope for complete success. Other leguminous forage crops are being tested, both at Arlington Farm and at various places in the several States. Among these is a new and promising variety of alfalfa from South America that resists the rust which frequently attacks the common form, and which grows taller than the latter. As soon as seed of this variety can be obtained in quantity it will be distributed in those sections where there is most need of it.

WEST INDIAN CASSAVA.

Writing in the *Gardeners' Chronicle* of April 18, Mr. Robert Thomson, Half Way Tree, Jamaica, alluding to the cassava plant as a producer of commercial starch and glucose, states that while 10 tons of cassava per acre, with a yield of 30 to 36 per cent. of starch, is a moderate estimate for the West Indies, potatos in Europe only yield an average of 6 tons per acre from which the contained starch amounts to 16 per cent. Mr. Thomson adds: 'During the past few years, Florida has established cassava cultivation on a commercial scale not only for making starch and glucose, but also as a stock-feed from the tubers and by-products.'

EDUCATIONAL.

Lectures to Teachers at St. Lucia.

A scheme for a series of lectures on Elementary Agricultural Science to the teachers of the St. Lucia primary schools during the summer holidays has been prepared by Mr. J. C. Moore, the Curator of the Botanic Station. The scheme proposes that the course of instruction should be given at the Agricultural School where teachers attending the lectures could be accommodated and the apparatus and plots would be available for demonstrations. Sixteen lectures of two hours duration each are proposed to be given, one in the morning and one in the evening of each day, the course thus occupying eight days. The lectures and demonstrations will be based on *Nature Teaching*.

In a letter to his Honour the Administrator, Dr. Morris, the Commissioner of Agriculture for the West Indies, suggests that a copy of Mr. Moore's scheme be forwarded to the Inspector of Schools and the Agricultural Instructor and that these officers be invited to co-operate heartily in the scheme. Dr. Morris also suggests that the control of the teachers, etc., be left entirely in the hands of the Inspector.

Elementary and Superficial Teaching.

The Right Hon. James Bryce, in his paper on 'The Importance of Geography in Education' which appeared in a recent number of the *Geographical Journal*, says:—

> There is all the difference in the world between being 'elementary' and being 'superficial.' I would not suggest that schools should deal with the subject if only a superficial treatment could be given to it, but I believe that even elementary knowledge may be made profitable, provided that it is always given in close connexion with facts which the pupil can be taught to observe for himself and to reflect on for himself, and not as a mere string of data to be carried in the memory.

SHEEP-RAISING IN THE WEST INDIES.

Colonel J. Biddulph, who recently spent a winter in the West Indies, offers the following suggestions in regard to raising sheep in certain of these colonies, viz., those possessing a dry climate and suitable areas of grass lands. The Barbados sheep referred to is probably of African origin. It has little or no wool, is hardy and yields excellent mutton:—

> From all I saw in the West Indies and from talks with two Jamaica landowners on my passage home, I am convinced there is an opening for sheep-raising in Jamaica, as well as in Nevis and one or two of the northern islands. There is no competition from Porto Rico and Venezuela such as there is in the beef trade; and, in spite of some drawbacks, Jamaica ought to be able to compete with the United States in supplying mutton to the West Indian islands. The native Barbados sheep seems to me to deserve more study than it has hitherto had.

AGRICULTURAL SOCIETIES.

British Honduras.

The following is an extract from the speech of the Governor (Sir David Wilson, K.C.M.G.,) in opening the Legislative Council on March 6, 1903:—

> A feeling of greater confidence in the development of the undoubted rescources of the colony seems to be growing up; the establishment of a Society of Agriculture and Commerce seems to be giving a considerable impetus to agricultural pursuits, on the successful carrying on of which the future of the colony must so much depend; there seems to be better prospects of the introduction of capital for the better carrying on of such pursuits, and the advantages to be obtained from the instruction, demonstration, and advice which are now being given by the Superintendent of the Botanic Station in country districts are beginning to be realized and appreciated by small planters.

Dominica.

Mr. A. K. Agar, the Secretary of the above Society reports that a large meeting was held at the Court House, Roseau, on Tuesday, April 14, to meet Mr. H. A. Ballou, B.Sc., the Entomologist to the Imperial Department of Agriculture. His Honour the Administrator was in the chair. Mr. Ballou gave a very interesting address on scale insects and the best remedies to use against them. Several questions were answered by the lecturer and an interesting discussion followed.

St. Lucia.

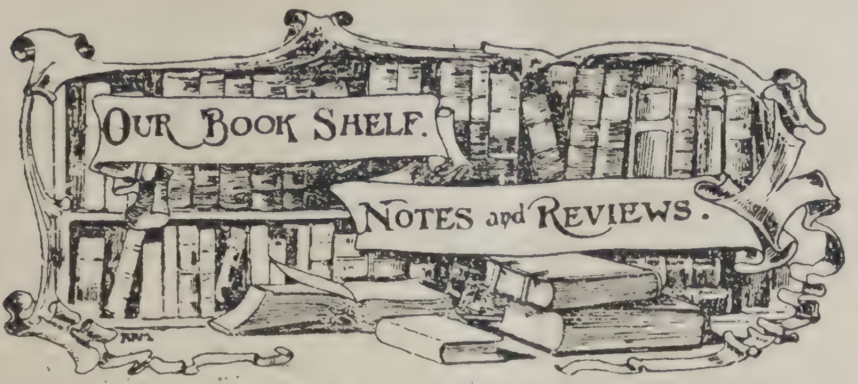
The *Voice of St. Lucia* states that the ærmotor set up on the Rivière Dorée estate, Choiseul, by Mr. George Barnard, to drive the cotton gin imported by the St. Lucia Agricultural Society is a perfect success, cleaning 40 ℔. of cotton in an hour, while the wind power is quite powerful enough to work three or four gins of the same capacity.

QUEEN OF FLOWERS.

This magnificent flowering tree, a native of Ceylon and India *(Lagerstræmia Flos-reginæ)*, is well known in the West Indies but it is not so generally cultivated as it deserves. Besides the beauty of its flowers the timber is very valuable. The flowers are usually purple but there is a handsome variety at the Botanic Station at Antigua with pink flowers.

With regard to the occurrence of the tree at Barbados, the Hon'ble Forster M. Alleyne (Porter's) writes as follows:—

> I think you would be conferring a great benefit to Barbados, if you would endeavour to increase the supply of plants of our beautiful flowering tree the 'Queen of Flowers,' which seems to be merging on extinction. I have a fine tree here, now in full bloom, which bears copious seed pods, but for years past I have been unable to obtain fertile seed. I have also tried cuttings and layers, but to no effect. Possibly others more skilful than myself have succeeded; but I have not heard of them. All the trees of this species which I know in Barbados are very old, and there seems reason to believe that it will die out in a few years if efforts are not made to rejuvenate it. The skill of your Department may remedy this evil, either by raising seeds or by importing young plants from other islands, which could not fail to be a great boon to the community.


OUR BOOK SHELF.
NOTES and REVIEWS.

NOTES ON THE RED CEDAR. By Charles Mohr, Ph. D. *Bulletin No. 31, of the United States Department of Agriculture, Division of Forestry. Washington, 1901.*

In the West Indies two 'Red Cedars' are often recognized, the first a species of Juniper, and the second *Cedrela odorata*, a member of the order to which the mahogany belongs. Juniper cedars form the subject of this pamphlet, and two distinct species are recognized as occurring in the United States. *Juniperus virginiana*, Linn., (ordinary Red Cedar) and *J. barbadensis* Linn. (Barbados Red Cedar.) Points of difference in foliage, flowers, etc., by which it is stated these two trees can be distinguished are detailed and their habits of growth are illustrated by two full page plates. The distribution of these trees throughout the states is clearly shown in colours on a map. *Juniperus virginiana*, the most important species in America, also occurs in the Blue Mountains of Jamaica. A good account is given of its structure, it uses, its insect and fungoid pests, as well as directions for its management in plantations. At the conclusion a few words are devoted to the Barbados Red Cedar. The exact relationship of this species to the previous one and the Bermuda Cedar, space does not allow to be touched upon here. The pamphlet is well illustrated throughout, and brings together, in a useful manner, knowledge of an important timber tree.

SALE OF AGRICULTURAL SEEDS.

In May 1900, a Departmental Committee was appointed by the British Board of Agriculture to inquire into the conditions under which agricultural seeds were then sold, and to report whether any further measures could with advantage be taken to secure the maintainance of adequate standards of purity and germinating power. We gather from the Report of the Committee, presented to both Houses of Parliament by command of His Majesty, that on making careful inquiry into the conditions under which seeds are now sold, they found that these conditions vary considerably in different parts of the country. There appeared to be a consensus of opinion on the part of the witnesses that no difficulty is experienced by farmers of education and position in obtaining good and reliable seeds from reputable seed merchants. On the other hand, it was generally admitted, both by seedsmen themselves and by farmers who appeared before the Committee, that a quantity of inferior seed is sold throughout the country. As a result of their inquiry, the Committee 'think that every encouragement should be given to seed merchants to give a guarantee with the seeds they sell, and that farmers should be advised to buy only subject to such guarantee, and to test the seeds they have purchased. In order to reduce to a minimum all difficulties in the way of such practice, they recommend the establishment of one central seed-testing station, under Government auspices, whose practice and procedure should be laid down and from time to time revised by a small Committee of experts.

PLANTAIN AND BANANA FIBRE.

Interest appears to have lately been revived in India in the possible utilization of the fibre found in the stem of the plantain and banana. This is a subject that regularly crops up, from time to time, in journals devoted to tropical agriculture.

The present revival discloses no new facts, and we fear that nothing practical is likely to result from it.

It is well known that Manila hemp is obtained from a plantain grown in the Philippines, but the fibre of this is pre-eminent for its strength and lustre. The fibre of no fruit-yielding plantain or banana can compare with it.

The first point to be considered in regard to the latter is the very small quantity of fibre actually obtainable from a single stem. This is under 2 per cent. of the gross weight. That means that 100 tons weight of stems would have to be cut, trimmed and treated to obtain 2 tons of fibre. The stems themselves are very bulky and cannot be carted to a central spot to be cleaned without considerable expense. If a simple and effective machine were devised suitable for being carried about so as to enable the fibre to be extracted on the spot, that would be of great advantage. So far, nothing of the kind has been invented capable of turning out fibre on a commercial scale and at a small cost.

The second point to be considered is the fact that plantain and banana fibre is generally poor in quality. It is only moderately strong, it is usually darker than Manila hemp, and it will only sell when the price of Manila and Sisal hemps is exceptionally high. It might then fetch about £12 to £15 per ton.

It is stated that plantain fibre from India was lately valued in London at £25 to £35 per ton and that 'a plantain estate should yield over £20 per acre for fibre alone.' We have no faith in these figures. They cannot, in any case, be relied upon as applicable to the plantain and banana fibre obtainable in the West Indies.

In closing these remarks we cannot do better than quote the following summary of the present position in regard to plantain and banana fibre in these colonies:—

> The plantain, in Jamaica *(Musa sapientum*, var. *paradisiaca)*, produces a white, glossy fibre at the rate of 1·81 per cent. of the gross weight. The price of the best plantain and banana fibres is, however, seldom above £12 per ton, and they would only fetch this price when there is a high demand for white-rope fibres, and a short supply of Manila and Sisal hemps. In spite of this, it is worthy of consideration, whether the immense number of banana stems cut down every year in the West Indies (estimated at 50,000,000) could not be utilized for their fibre. It is admitted that it is not sufficiently good to compete with first-class rope fibre; but it might, possibly, be used for making coarse paper, as a packing material, or in the manufacture of *papier maché*.*

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* *Cantor Lectures on Commercial Fibres*, by D. Morris, D.Sc., C.M.G. London: Society of Arts, 1895.

GLEANINGS.

Nearly 2,000 acres of sugar-cane are now under cultivation by cane farmers in Trinidad. This is nearly double the amount hitherto attributed to them.

A very striking halo round the sun, at noon, was observed at Barbados on May 6. This appeared to be similar to what is known as a circum-solar rainbow, a phenomenon comparatively rare even in the tropics.

The diplomas and prizes awarded to exhibitors at the recent Agricultural Show held at Antigua, under the auspices of the Imperial Department of Agriculture, were presented by the Governor, Sir Gerald Strickland, K.C.M.G., on March 27 last.

It is stated in *Indian Planting and Gardening* for March 21, that among the plants recently in bloom at the Royal Botanic Gardens, Calcutta, was *Tecoma serratifolia* (Tabebuia serratifolia). This plant is described as a handsome tree-shrub from the West Indies bearing tubular yellow flowers. It may be mentioned that *Tecoma serratifolia* is the familiar Poui tree of Trinidad.

Commenting on the success of onion-growing, under the auspices of the Imperial Department of Agriculture, in the northern islands, the *Grenada Federalist* asks: 'Will it pay to cultivate onions in Grenada? At present the selling price, locally, is 6*d*. per ℔. We import, according to official statistics, onions to the value of £550 annually. Grenada ought to produce onions more than sufficient for local demands thus keeping the money at home that is sent abroad. It ought, also, to supply the American market.'

Mr. Lunt, the Curator of the Botanic Station at St. Kitt's, reports that a visit was recently paid to that island by the Lieutenant-Governor and the ex-Lieutenant-Governor of St. Eustatius. The visitors were taken by Mr. Lunt, over the Botanic Station, the Sugar Experiments and the Agricultural School; they manifested a keen interest in what they saw and expressed their thanks to Mr. Lunt for his assistance.

Mr. J. H. Hart, F.L.S., the Superintendent of the Botanical Department, Trinidad, recently forwarded to the Imperial Department of Agriculture a sample of oil expressed from the seed of a palm, growing in the Botanic Garden, known as *Astrocaryum aureum*. Mr. Hart describes the seed as being hollow, with a white albumen, like that of a cocoa-nut, a quarter of an inch thick. The oil is obtained solely from the outer covering (*pericarp*) of the seed, it is tasteless and has a fine golden colour. One hundred seeds, Mr. Hart states, produce 300 c.c. (about a half-pint) of oil.

A cucumber grown by Mr. Astley Smith near Kingston, Jamaica, is described as 28 inches long and 3½ inches wide. This, for a tropical production, is worthy of record.

The Rev. N. B. Watson writes:—The mungoose has without doubt greatly altered the conditions of animal life in Barbados, and I am quite convinced that the time has come for regarding it as a serious pest.

In reference to the Sugar-cane Experiments carried on in the Leeward Islands, the Secretary of State for the Colonies has expressed the opinion that the Report recently published, for the year 1901-2, is 'a valuable record of the important experiments carried on under the direction of the Imperial Department of Agriculture in the West Indies.'

Alluding to the possibility of developing an export trade in Avocado Pears, the Report on Agri-Horticultural Work in Jamaica for the year 1901-2, states that experiments in budding this fruit have been carried out at the Hope Experiment Station in that island with the result that the Avocado Pear is found to bud quite as easily as the orange. The fruit in which the seed occupies the whole of the central cavity is said to be the best for shipping purposes as there is then no bruising by the movement of the seed inside.

The Local Agricultural Instructor at Montserrat (Mr. Dudley Johnson) in a report dated May 2, supplies interesting information with regard to the results of the onion experiments in that island. Mr. Johnson states that the onion season is now over. 'Altogether 402 crates were shipped. Of these, 138 crates went to New York and the remainder (264 crates) to St. Lucia, Barbados, Dominica, St. Kitt's and St. Thomas. St. Lucia proved our best market as all the onions sent there sold at 4c. per ℔. Those sent to New York sold at $2.00 to $2.25 per crate (50 ℔.) The quality was favourably reported on. The peasantry are gradually realizing that the industry is a profitable one and some who failed last year are trying again.'

The Report on Agri-Horticultural Experiment Work in Jamaica for 1901-2 mentions that of seventy *grafted* nutmeg trees which were planted out at the Hope Experiment Station with the view of ascertaining whether these could successfully be used for replacing male or infertile trees in established plantations thirty-three died and, of the remainder, only twenty-five can be regarded as making satisfactory growth. Even in these the growth shows a tendency to develop after the manner of the lateral branches on the parent tree rather than upwards. All attempts to *bud* nutmegs have entirely failed.

Readers of the *Agricultural News* are informed that portfolios, half-bound, leather, marble sides, gilt-lettered at back to hold a year's issue may be obtained at 2*s*. each. Also, that Vol. I can be bound with title page and index, full cloth, at 2*s*. 6*d*. each; or half-bound, leather, marble sides at 3*s*. each. This is for binding only. All correspondence in reference to the supply of portfolios and for binding the *Agricultural News* should be addressed to the *Advocate* Printing Works, Prince William Henry Street, Bridgetown, Barbados.

BIRD NOTES.

Insectivorous Birds.

The Barbados blackbird *(Quiscalus)* with a black, glossy coat and about the size of an English blackbird, is invaluable in the destruction of insects. It is constantly to be seen in fields and gardens catching and eating insects. A flock of these birds has been known to clear a field of sweet potatos attacked by 'worm' within a few days. In fact, without its blackbird, Barbados would lose thousands of pounds' worth of crops every year.

The tick-bird or long-tailed blackbird *(Crotophaga)* with a parrot-like beak, is another useful destroyer of grasshoppers, beetles and ticks. At Trinidad, Mr. Hart states that this bird also destroys the mole-cricket, possibly the most troublesome of all insect pests in the West Indies.

BRITISH HONDURAS.

It is evident that since the arrival of the Hon'ble P. C. Cork as Colonial Secretary of British Honduras, a good deal of interest has been awakened in agricultural matters. There can be no doubt that, if all classes of the community join together and heartily support the efforts of the newly formed Agricultural Society, the colony generally will be benefited.

In British Honduras, as elsewhere, steps are being taken to start the cultivation of cotton. The Agricultural Society in its letter to the British Cotton Growing Association states that British Honduras 'is the only British possession in Central America and its area, 7,562 square miles, is almost equal in extent to the total area of the British West Indian Islands.'

A Bee-keepers' Association has been formed and it has been granted the use of the room of the Agricultural Society free of charge.

It has long been suggested that the Cohune nuts, abundantly produced by a majestic native palm *(Attalea Cohune)* might be utilized for yielding oil. (By the way, a fine representation of this palm and its fruit, drawn by Lady Thiselton-Dyer, appears in the cover of Dr. Morris' book *The Colony of British Honduras*, London: Stanford, 1883.) It is now proposed to invite a large manufacturing firm at Buffalo, New York, to supply a machine for crushing the nuts and obtaining the kernels.

Webber's new (formaldehyde) method of extracting rubber from the native india-rubber tree *(Castilloa)* is to be tried by the Superintendent of the Botanic Station.

The disease of cocoa-nut palms is being investigated by a strong committee. This is a matter of considerable importance to the colony.

Last, but not least, the idea of employing a travelling Agricultural Instructor to assist in starting new industries is being mooted.

The need of the 'living voice' and of practical demonstrations are rightly urged upon the Government. We may take it that, if a sufficient number of cultivators are in earnest in asking for an Agricultural Instructor, sooner or later he will be supplied. Altogether there are signs that British Honduras is decidedly waking up in agricultural matters.

DEPARTMENT NEWS.

Dr. D. Morris, C.M.G., Commissioner of the Imperial Department of Agriculture for the West Indies, on the invitation of the Governor, will proceed to British Guiana by the Royal Mail Steamer due to leave Barbados on May 25 next. Dr. Morris will probably return by the Royal Mail Steamer due at Barbados on June 6.

Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture completed his tour of visits in the northern islands and landed at Barbados on May 9. Mr. Ballou will remain at the Head Office for a short period and will afterwards proceed on a tour in the southern islands.

Mr. Henry Millen, Curator of the Botanic Station at Tobago, proceeded to England on May 1, in s.s. *Torgorm* on three months' leave of absence on full pay. Mr. N. Lord will be Acting-Curator and he will carry out his duties under the direction of Mr. J. H. Hart, F.L.S., the Superintendent of the Royal Botanic Gardens at Trinidad.

THE TREE PLANTER'S MISSION.

The tree planter referred to in the following extract was the Hon'ble J. Sterling Morton, Secretary of Agriculture in the United States from 1893 to 1897 and well known as the father of Arbor Day:—

A striking incident occurred out in mid-Nebraska the other day, and one that should be pondered by every dweller in the unforested lands, East or West. The funeral services of the late J. Sterling Morton were held at the homestead where, in 1855, Mr. Morton and his young wife located their claim. At that time not a semblance of a tree was in sight over the level plain that reached away like the green waters of a quiet sea. When the neighbours and friends gathered for the sorrowful ceremony, they walked through a forest of tall trees up to the beautiful grounds of the Morton home. In front of the house were towering trees, many of them pines, interspersed with shrubs. On either side stretched the broad acres of apple orchards in full bloom, as fair a sight as one might wish to see, while away toward the town was Morton Park, a rich woodland, the pride of the community.

All this was the work of one man, a man who loved trees and caused more to be planted than any other man in the world. He made of the barren prairie a varied landscape. More than that, he showed to the eager Westerners that there is not only an artistic and ethical meaning in the tree-planter's mission, but a financial gain as well—a lesson that in the West's present stage of development probably has as strong a bearing as any argument that might be presented. The little claim that he homesteaded was, in the beginning, like those of hundreds of his neighbours. Because of his efforts in beautifying it and in covering its acres with trees it became very valuable, and is to-day one of the most attractive pieces of country real estate in the West. The father of Arbor Day set before the West a great object lesson. While it was by no means lost on the people of his generation, it was when the passing away of the tree-planter made a complete summary of his life possible that the force of the precept and example was most strikingly brought home to their hearts.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—April 28, 1903.—Messrs. Kearton Piper & Co., Messrs. A. E. De Pass & Co., Messrs. J. Hales Caird & Co., 'The Gardeners' Chronicle,' April 25 1903, 'The Public Ledger,' April 25, 1903, and 'The Weekly Cotton Circular,' April 17, 1903.

Aloes—Curaçoa, 14/6 to 40/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, $1\frac{7}{8}$*d.* to $3\frac{1}{2}$*d.* per lb.
Bees-wax—Jamaica, £7 15*s.* to £8 5*s.* per cwt.
Cacao—T'dad, 59/- to 68/- per cwt. ; Jamaica, 51/6 to 58/6 per cwt. ; Grenada, 52/6 to 59/6 per cwt. ; Dominica, 54/- to 58/- per cwt.
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 29/- to 50/6 per cwt.
Cotton—West Indian, $5\frac{7}{16}$*d.* to $5\frac{7}{8}$*d.* per lb.
Fruit—
  Bananas—8/- to 12/- per bunch.
  Oranges—12/- to 16/- per case.
  Pines—3/- to 4/- each.
Fustic—£4 12*s.* 6*d.* per ton.
Ginger—39/- to 68/- per cwt.
Honey—Jamaica, 16/- to 23/6 per cwt.
Kola Nuts—1*d.* to 4*d.* per lb.
Lime Juice—Raw, 9*d.* to 10*d.* per gallon. Concentrated, £14 per pipe.
Logwood—£4 10*s.* to £4 15*s.* per ton. (Prices unchanged).
Mace—1/7 to 2/2 per ℔.
Nitrate of Soda—Agricultural, £9 7*s.* 6*d.* per ton.
Nutmegs—70's to 75's, 1/6 to 1/9; 80's to 90's, 1/2 to 1/4 per ℔.
Pimento—$2\frac{5}{8}$*d.* to $2\frac{7}{8}$*d.* per lb.
Rum—Demerara, $8\frac{1}{2}$*d.* to 10*d.* per proof gallon. Jamaica, 1/7 to 8/- per proof gallon.
Sugar—Muscovado, 12/6 ; Crystallized, 14/- to 16/- per cwt.
Sulphate of Ammonia—£13 10*s.* per ton.

New York,—May 1, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, $1.25 ; eight hands, $1.00 per bunch.
Cacao—African, $12\frac{1}{4}$c. to $12\frac{1}{2}$c. ; Caracas, 13c. to $13\frac{3}{4}$c. ; Jamaica, $10\frac{3}{4}$c.; Grenada, 12c. ; Trinidad, 12c. to $13\frac{1}{2}$c. per ℔.
Cocoa-nuts—Trinidads, $17.00 to $19.00 ; Jamaicas, $19.00 to $20.00 per M.
Coffee—Jamaica, fair to good ordinary $5\frac{1}{2}$c. to $6\frac{1}{4}$c. per ℔. ; Manchester grades 8c. to $10\frac{1}{2}$c. per ℔.
Ginger—Jamaica, $7\frac{1}{2}$c. to 8c$\frac{1}{4}$. per ℔.
Pimento—$4\frac{3}{4}$c. per lb.
Rubber—Nicaragua scrap, $67\frac{1}{2}$c. to $68\frac{1}{2}$c. per lb. Guayaquil strip, 62c. to 63c.
Sugar—Muscovado, 89°, $3\frac{3}{16}$c. per lb.; Centrifugals, 96°, $3\frac{11}{16}$c. ; Molasses, 89°, 3c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 6, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—20c. per gallon, package included.
Sugar—$1.40 per 100 ℔.

Barbados,—May 9, 1903.—Messrs. T. S. Garraway & Co. and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb.
Cacao—$12.00 per 100 ℔.
Coffee—Jamaica and ordinary Rio, $8.00 to $8.50 per 100 ℔.
Hay—New Brunswick, 85c. per 100 lb.
Manures—Nitrate of Soda $60.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $80.00 ; Sulphate of Potash $67.00 per ton.
Molasses—18c. per gallon, and $4.00 for puncheon.
Onions—Bermuda, $1.91 to $2.27.
Potatos, English—$3.00 per 100 lb.
Rice—Ballam, $4.70 per bag (190 ℔.) ; Patna, $3.50 per 100 ℔. ; Rangoon, $2.75 per 100 lb.
Sugar—In hogsheads $1.25 per 100 ℔., and $5.00 for hhd. In bags $1.50 per 100 lb.

British Guiana,—May 7, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8.50 to $9.00 per barrel.
Cacao—Native, 11c. to 12c. per lb.
Cassava Starch—$7.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica, 11c. to $11\frac{1}{2}$c. per lb. (retail.) —Creole, 11c. to 12c. per lb.
Dhal,—$3.70 per bag of 168 ℔.
Eddoes—$1.44 per barrel.
Molasses—Vacuum Pan, yellow, 16c. per gallon, casks included.
Onions—7c. to 8c. ; Garlic 8c. to 9c. per lb.
Pea Nuts—Curaçoa, $3\frac{3}{4}$c. ; American, 5c. per lb. (retail).
Pigs—Young Boars and Sows, $5.00 each.
Plantains—20c. to 36c. per bunch.
Potatos, English—$3.00 to $3.25 per barrel.
Rice—Ballam, $4.70 to $4.75 ex store ; Patna and Seeta, $5.60 to $5.90 per bag.
  Creole Rice, 20c. per gallon (retail).
Sweet Potatos—Barbados, $1.00 per barrel.
Tannias—$1.20 per bag.
Yams—$1.92 per bag.
Sugar—Dark Crystals, $1.90 to $1.91 ; Yellow, $2.25 to $2.40 ; Molasses, $1.80 to $1.90 per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—Messrs. Edgar Tripp & Co., May 7, and Messrs. Gordon Grant & Co., May 7, 1903.

Balata—38c. per lb.
Cacao—Ordinary, $12.25 to $12.50 ; Estates, $13.00 per fanega.
Coffee—6c. to $6\frac{1}{4}$c. per lb.
Onions—$2.55 to $2.75 per 100 lb.
Potatos, English—$1.70 to $1.80 per 100 lb.
Rice—Yellow, $4.25 to $4.35 ; White Table, $5.25 to $6.00 per bag.
Sugar—Yellow Crystals for local consumption, $2.25 per 100 ℔.
  —Molasses sugar, $1 80 to $2.00 per 100 ℔.

Publications on sale of the Imperial Department of Agriculture
FOR THE WEST INDIES.

The 'WEST INDIAN BULLETIN.' A Quarterly Scientific Journal.

Volume I. Reports of the Agricultural Conference of 1899 and 1900 and other papers; complete, in the original paper covers as issued, post free, 5*s.* The parts can no longer be sold separately.

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Volume IV. No. 1. Papers on general subjects. Price 6*d.*, post free 8*d.*

PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied :—

(3) Seedling and other Canes, at Barbados, 1900. Price 2d. Post free, 2½*d.*
(5) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d.* Post free, 4½*d.*
(6) Recipes for cooking Sweet Potatos. Price 2*d.* Post free, 2½*d.*
(7) Scale Insects of the Lesser Antilles, Part I. Price 4*d.* Post free, 5*d.*
(9) Bee-keeping in the West Indies. Price 4*d.* Post free, 5*d.*
(12) Seedling and other Canes in the Leeward Islands, 1900-1901. Price 2*d.* Post free, 2½*d.*
(13) Seedling and other Canes at Barbados, in 1901. Price 4*d.* Post free, 5*d.*
(14) Screw Worm in Cattle at St. Lucia. Price 2d. Post free, 2½*d.*
(15) Plain Talk to Small Owners Price 2*d.* Post free, 2½*d.*
(16) Hints on Onion Cultivation. Price 2*d.* Post free, 2½*d.*
(17) General Treatment of Fungoid Pests. Price 4*d.* Post free, 5*d.*
(18) Recipes for cooking West Indian Yams. Price 2*d.* Post free, 2½*d.*
(19) Seedling and other Canes at Barbados, in 1902. Price 4*d.* Post free, 5*d.*
(20) Seedling and other Canes in the Leeward Islands. Price 2*d.* Post free, 2½*d.*
(21) Cotton and Onion Industries in the West Indies. Price 2*d.* Post free, 2½*d.*
(22) Scale Insects of the Lesser Antilles, Part II. Price 4*d.* Post free, 5*d.*
(23) Notes on Poultry in the West Indies. Price 4*d.* Post free 5*d.*

'NATURE TEACHING.'

A text-book based upon the general principles of Agriculture for the use of schools, prepared by the Honourable Francis Watts and others. (Pages XII and 199) The Plant, the Soil, Plant food and Manures, Weeds, and Insects are successively treated, and the information given is illustrated throughout by simple experiments which can readily be carried out in an ordinary school. The book is mainly intended for the use of Teachers. Price, limp cloth 2*s.*, or in a superior style of binding 2*s.* 6*d.* Postage in either binding, 3½*d.* extra.

The 'AGRICULTURAL NEWS' A Fortnightly Review.

The '**Agricultural News**' contains extracts from official correspondence and from progress and other reports; notes on interesting points connected with the work carried on at the Government Laboratories, Botanic Stations, Experiment Stations, Agricultural Schools, Experiment Plots, School Plots, Agricultural Shows, Lectures to teachers, etc., the appointment, promotion and removal of officers, the weather, and, in fact, any information indicating what is going on in each colony and the progress made in Agricultural matters throughout the West Indies.

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[33.]

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Solids not Sugar	·184	·163
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Glucose ratio	2·29	1·99

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AGRICULTURAL
NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Subsidiary Crops.

In past years, in many of the West Indian islands, the sugar-cane was the only crop of importance that was cultivated, and this is still, to a great extent, the case in some of the islands, notably in Barbados, Antigua and St. Kitt's. The fall in the price of sugar, however, consequent on the rise of the beet sugar industry in Europe, has caused planters to realize the fact that a one crop policy does not pay.

The outlook for the future, moreover, is not too promising even with the abolition of the sugar bounties: the United States, at present the largest importers of West Indian sugar, are developing a beet sugar industry which has already assumed large proportions, while in Cuba a promising field for the cultivation of the sugar-cane is being extended. Even in England it is possible that a beet sugar industry may be started. If the sugar-cane is to be cultivated in future with profit, it will only be by a careful study of the best varieties to grow and of the best methods by which to grow them.

Fortunately, the West Indian planter has, if he will only realize it, the choice of several crops, which can be used to replace the sugar-cane, at least in places where the soil or other conditions are not specially suited to that crop.

One great advantage in possessing crops which can be substituted for the sugar-cane is often lost sight of and may be pointed out here. This is the help it gives the cultivator in combating disease. Where, as in England, rotation is practised and the same crop is not planted on the same land for four years, a fungus or an insect has far less chance of obtaining a permanent home in the soil than it has in the West Indies, where sugar-cane crop follows sugar-cane crop with only a short interval. The danger of this is well shown in the paper on 'Root-borer of the Sugar-cane' by the Rev. N. B. Watson (*West Indian Bulletin*, Vol. iv, p. 37), and the point is of the greatest importance in dealing with the root disease of the sugar-cane caused by *Marasmius*. If a badly infested field could be thrown out of sugar-cane cultivation for two or three years and planted in some other crop which is not liable to the disease, our insect and fungus pests would give far less trouble.

Fruit is now one of the most important subsidiary crops of the West Indies and in some of the islands, notably Jamaica, has largely replaced the sugar-cane. There is no reason why the industry should not be developed much further, if growers would only realize the necessity for careful cultivation, packing, etc. If fruit growing is to be developed as an industry, West Indian growers must remember that they have up-to-date competitors and that they must meet them with equally up-to-date methods. The best varieties only should be grown, the cultivation should be careful and scientific, the fruit should be carefully picked, handled, sorted, graded and packed, and the forwarding of it to foreign markets should be carefully looked after.

Cotton, it is to be hoped, will become again one of the most important crops of the West Indies. In many of the islands the cotton industry is already established and in others there is every prospect of its becoming so. The demand for cotton is a constantly increasing one, the supply, to England at least, is steadily decreasing, and there is no doubt that good cotton can be grown in these islands, as is shown, for instance, by the report received from the British Cotton Growing Association on some cotton grown in Montserrat (see p. 178 of this issue).

Limes form the most important crop in Dominica and Montserrat and we are glad to notice (p. 182 of this issue) that some, at least, of the planters are using up-to-date methods in dealing with their insect enemies.

Onions, again, can be, and to an increasing extent are being, grown profitably in the West Indies. At present enough are not grown to meet the local demand and even if this were exceeded there would always be a market for the surplus in New York. Here, again, the question of sorting and packing has to be considered (see *Agricultural News*, Vol. II, p. 152) and, unless West Indian cultivators are prepared to accept far lower prices than their rivals, they must take equal care that their produce is put on the market in good condition.

The ground nut industry is another that might very well be extended in the West Indies. At present ground nuts are actually imported from the United States for eating purposes. There is no good reason why this should be and, more, why the ground nut should not be used as a source of oil and oil-cake to replace the expensive cotton seed oil, olive oil, oil-cakes, etc., which are at present imported in large quantities.

There are many other subsidiary crops that could be grown with profit in these islands, as a perusal of the back numbers of the *Agricultural News* and other publications of the Imperial Department of Agriculture will show. From these every planter ought to be able to select some, to suit his own special conditions, which can be used as temporary substitutes for the sugar-cane.

COTTON.

Cotton at Montserrat.

The following is taken from a letter dated April 27, 1903, from the Secretary of the British Cotton Growing Association to the Commissioner of Agriculture for the West Indies:—

> You will be pleased to hear that we have had two small consignments of cotton, grown at Montserrat, both of which were very satisfactory. The first was sold at 10*d.* and a part of the second at 11*d.*, and we hope to clear the remainder at the same price. My committee will be very pleased to receive consignments from other growers. There is no doubt that the class of cotton which can be grown in the West Indies will secure a good market here. Cotton should be consigned to Liverpool or Manchester by direct steamer, as this saves a considerable amount of carriage. The cost of transit from Southampton to Lancashire towns is 38*s.* 7*d.* per ton against 9*s.* 2*d.* from Liverpool. This is a serious item.

Peruvian Cotton Seed.

There has recently been received at Barbados a supply of Peruvian cotton seed supplied by Messrs. Praschkauer and Co., 112, Fenchurch Street, London, E.C. In a letter addressed to the Colonial Office, Messrs. Praschkauer give the following particulars of this seed:—

> We take the liberty of sending you herewith sample of a class of cotton seed that we believe is unrivalled in any part of the world. The seed comes from a particularly favourable spot, namely, northern Peru, and is shipped to Europe only very occasionally. The cotton produced there has always realized the very highest price of any; we therefore consider it to be of special value for acclimatization purposes in the West Indies or in any tropical and sub-tropical countries with which your office is connected.

SUGAR INDUSTRY.

Experiments with New Canes in Cuba.

Mr. E. F. Atkins, the proprietor of Central Soledad, one of the largest sugar plantations in Cuba, has kindly contributed information respecting experiments with sugar-canes recently carried on under his direction.

In a letter, addressed to the Commissioner of Agriculture for the West Indies, Mr. Atkins writes as follows:—

> Central Soledad, Cienfuegos,
> April 3, 1903.
>
> In my last letter I promised to send you the results of the examination of our experimental canes and now have the pleasure of enclosing statement.
>
> These canes were ground in a small experimental mill in our machine shop which was run by a belt, so you can understand that the pressure was necessarily light, which accounts for the small extraction. The extraction was only noted for the purpose of comparison.
>
> Of the imported canes, your D. 95 shows the best, the comparative extraction being good and the purity of the juice highest of all. We had but a few stools of this cane but they are in good, healthy condition and I have saved them carefully for replanting which has just begun.
>
> I was quite surprised to find that the 'Louisiana Purple' made such a good showing; it never matures in Louisiana.
>
> All these canes were ground under similar conditions and were about twelve months old when cut. I hope that the figures may prove of interest to you :—

EXAMINATION OF EXPERIMENTAL CANES IN CUBA.

Origin	Name	Per cent. of juice by mill	Per cent.		Quotient of purity	Condition of canes
			Total solids	Saccharose		
Queensland	Dan. Dupont	55·00	17·50	14·70	84·00	Slightly sprouted
do.	W. Bamboo		16·80	13·90	82·70	do.
do.	Blk. Fiji	58·30	15·30	11·40	74·50	Badly sprouted
do.	Meira	60·00	18·90	17·50	92·60	Slightly sprouted
Barbados	Cal. Queen	51·50	19·20	17·50	91·10	Healthy
do.	B. 109	58·30	18·00	15·01	83·90	Borers
do.	B. 147	61·80	18·00	15·60	86·70	Healthy
do.	B. 156	57·10	18·40	16·00	87·00	do.
do.	Wh. Transp.	68·20	16·40	14·30	87·20	Slightly sprouted
do.	D. 95	63·20	20·40	19·50	95·40	Healthy
do.	B. 208	50·00	20·30	19·20	94·60	Slightly sprouted
Louisiana	La. Purple	54·10	19·50	18·20	93·30	Healthy
Jamaica	—	55·60	19·30	16·70	86·60	do.
Hawaii	Lahaina	65·60	15·17	12·80	81·50	Fungus
Java	G. Zamb. 100	57·10	19·80	18·40	92·10	
	do. 96	43·90	16·30	14·60	89·60	Healthy
Cuba	Blanca	58·30	18·20	16·30	89·60	Poor
do.	Sitiera	61·80	17·80	15·50	87·10	
do.	Yel. Cryst.	47·70	20·10	18·80	93·50	Healthy
do.	Red Caven.	57·90	15·30	11·60	75·80	do.

Cane Sugar in the United States.

As showing the possibilities of Georgia and Florida as sugar-cane producers, the *Sugar Planters' Journal* for March 28 last, reproduces certain remarks made by Dr. B. Stubbs after his visit to these states in 1900, from which we make the following extract:—

> Both the soil and climate of this section were favourable to the growth of cane, as evidenced by the splendid patches, sometimes increasing to small fields or plantations, found everywhere throughout this belt. These numerous object lessons demonstrate, beyond cavil, that if a progressive agriculture be adopted, by which the proper preparation of the soil, fertilization and cultivation of the plant, together with a rotation, including some leguminous crops, at short intervals, be secured, these sections can successfully make sugar and syrup in competition with the world.

In addition to this Dr. Stubbs mentions that two important factors in the successful development of a cane sugar industry are present in these states, namely, the saccharine richness of the cane, shown by analyses to be superior to canes grown upon the alluvial lands in Louisiana; and an abundant and efficient supply of labour. This furnishes an index of the increased competition which West Indian sugar producers may expect to meet, in the very near future, in the American market.

WEST INDIAN FRUIT.

RUSSET ORANGES.

By courtesy of the Director of the Royal Gardens, Kew, information has been communicated to the Department respecting an unhealthy condition of orange trees causing a brown or 'russet' appearance in the fruit.

The following is an extract from a letter (dated April 21) addressed by an English company, having fruit plantations in Jamaica, to the Royal Gardens, Kew:—

> Our object in troubling you with these samples is to crave your valuable advice as to what treatment these oranges require to prevent their becoming brown or 'russet' as you will find most of the specimens are. The 'russet' is apparently due to some fungoid growth or other disease, which the managers in Jamaica have so far been unable to cope with; and, as this appearance greatly deteriorates the fruit externally, without, however, affecting the flavour within, it is of the greatest importance to the company that such measures should be taken as would free the rind from this blemish.
>
> I may add that this company is an English company which, a few years ago, started orange growing in Jamaica on a systematic scale. The large plantations are only just coming into bearing, and it is found that a considerable percentage of the trees produce this 'russet' colour, though portions of the plantations produce good yellow oranges, such as the two specimens you will also find in the hamper wrapped in paper and marked 'Bright.'
>
> It is, of course, very unfortunate that so many of the trees should yield fruit of this objectionable colour, and it is for this reason that we venture to ask your kind aid and advice as to the proper treatment that should be adopted to remove the blemish in question.

In reply, the Director of Kew furnished the following information (prepared by Mr. George Massee, F.L.S.):—

> The 'russet' is the result of a disease too well known in Florida, and also said to be by no means common in Jamaica *. It is known in America as 'exanthema' or 'die back,' as in some phases of the disease the young shoots become more or less gummed and die back.
>
> The most general cause of the disease is the excessive use of organic nitrogenous fertilizers; especially when accompanied by much cultivation, which destroys the surface roots, and forces the tree to feed lower down in the soil.
>
> A second cause favouring the malady is when the trees are planted in low and badly drained soil, especially when there is an underlying 'hardpan.'
>
> REMEDIES.†
>
> When the disease can be traced to use of nitrogenous manures, as dried blood, cotton seed meal, stable manure, etc., great benefit results from ceasing to cultivate and allowing weeds to grow. For some time avoid nitrogenous manures, and use those containing potash and phosphoric acid.
>
> When in low lying land, with 'hardpan' some distance down, good drainage is often quite effectual alone. Mulch with good dead leaves or similar matter, and stop cultivation; by such means the roots are brought nearer to the surface.
>
> The 'turtle back' scale *(Lecanium hesperidum)* is abundant on some of the fruit. This can be got rid of by spraying. This scale, however, has nothing whatever to do with the 'russet' disease.

NUTRIENT QUALITIES OF FRUIT.

The *Tropical Agriculturist* for November 1902, states that the nutrient qualities of fruit vary considerably with the nature of the fruit: the banana, fig, date, and grape rank very highly, one pound of bananas is said to contain as much nourishment as half a pound of meat, and in their own indigenous country, Uganda, they are converted into jam, champagne, beer, vinegar and brandy. The date also contains a large percentage of nutrient material, and the native of the country to which it is indigenous not only feeds himself on it, but gives it to his horse and camel. Figs also are most wholesome and nutritious—grapes are especially so. Oranges are nourishing, and have a slight tonic influence on the liver, while the lemon is a popular remedy for rheumatism, and has no equal in the treatment of skin diseases—it is not only curative but preventive of the latter. The constituents of fruits are sugar, acids (either citric, phosphoric, malic, or tartaric), water, and a small percentage of fat and albumen. Important among the uses of fruits may be noted their diuretic and laxative effects.

---

* Weber, H. J., *Florida State Horticultural Society Annual* (1896).

† Practical notes, accompanied by illustrations of 'die-back,' are given in *Bulletin No. 8, United States Department of Agriculture* (1896).

WEST INDIAN PRODUCTS.

Spices and Drugs in the London Market.

In continuation of his articles on the London Spice and Drug Market, the last of which appeared in the *Agricultural News*, Vol. II, p. 149, Mr. J. R. Jackson, A.L.S., formerly keeper of the Musuems at the Royal Botanic Gardens, Kew, has contributed the following notes:—

The tone of the market has remained steady throughout the month of April. In the middle of the month, at the period of the Easter holidays, a certain amount of dullness prevailed, but towards the end a steady business feeling set in, with an upward tendency in some leading articles.

GINGER.

Amongst those which were offered at the spice sales, having special interest to West Indian readers, was Jamaica ginger, which, as indicated in our last notes, was then showing signs of a marked advance in prices. In the early part of the month as many as 513 barrels of Jamaica ginger were offered at one sale, realizing the following prices: 66*s.* for very fine bold; 62*s.* 6*d.* for fine; 50*s.* to 56*s.* 6*d.* for good washed; 43*s.* to 48*s.* 6*d.* for medium dull; 41*s.* to 42*s.* 6*d.* for ordinary dullish; and 39*s.* to 41*s.* for common to ordinary. At the auction on April 22, Jamaica took the lead in prices, and was represented by the very large supply of 1,134 barrels, for which there was an active demand at the following rates :— Very fine bold, 57*s.* 6*d.* to 58*s.* 6*d.*; bold, 51*s.* 6*d.* to 52*s.* 6*d.*; medium dull to medium washed, 43*s.* 6*d.* to 48*s.* 6*d.*; ordinary to good, 42*s.* to 43*s.*; common and ordinary lean, 40*s.* 6*d.* to 41*s.* 6*d.* Of Cochin ginger there was also the large supply of 1,345 bags, of which only 85 were sold, realizing for fine, bright Calicut, 40*s.*; brown tips, 37*s.* 6*d.*; good, bright cuttings, 37*s.*; while good, washed, rough was bought in at 39*s.* At the sale a week later, being the last one in the month, ginger had somewhat quieted down, but steady prices were maintained, good to fine Jamaica being quoted at 50*s.* to 57*s.*; middling washed, 45*s.* to 47*s.*; middling dullish, 43*s.* to 44*s.* 6*d.*; and ordinary 41*s.* to 42*s.* 6*d.*; while the quotation for medium, native cut Cochin was 55*s.*

Summing up the results of the month with regard to this important product, it will be seen that prices generally for Jamaica have been much more satisfactory than they have been for some time past, a position which West Indian growers should aim at maintaining.

ARROWROOT.

Of arrowroot, 360 barrels of St. Vincent were offered and sold at the sale on April 1, at prices from 2*d.* to 2¼*d.* per ℔. for ordinary to fair manufacturing, and these prices experienced but little change during the month.

TAMARINDS.

Tamarinds formed an important item in the commerce of the month. At the auction on the 22nd. as many as 794 packages of new crop Antigua and 20 packages of St. Kitt's were offered. The consignment was of a very mixed quality, the bulk being described as pale, dry and stony. The prices asked were from 9*s.* 6*d.* to 10*s.* 6*d.* Ten barrels only were sold, fetching the latter price in bond, though some private sales were afterwards effected. A week later at the spice auctions the report was that 74 packages of Antigua were bought in and about 200 barrels were sold privately at 9*s.* to 10*s.*, in addition to which 50 barrels of the same quality were disposed of at the drug auctions and 8 hogsheads in bond at 10*s.*

SARSAPARILLA.

Towards the end of the month sarsaparilla began to arrive in large quantities, amounting to 65 bales of grey Jamaica, 6 of Lima Jamaica and 6 of native red. The prices obtained were as follows:—Grey Jamaica, 1*s.* 2*d.* for sound and 10*d.* to 1*s.* 1*d.* for damaged and coarse ; Lima Jamaica, 11½*d.* to 1*s.*; red and grey native, 10½*d.* to 1*s.* 1*d.*

NUTMEGS, MACE AND PIMENTO.

With regard to other spices, nutmegs at the beginning of the month declined 1*d.* to 2*d.* with a still lower tendency at the close of the month, while mace, which was represented at the first sale by 11 packages of West Indian, sold at 1*s.* 10*d.* to 2*s.* for ordinary to fair red, and 1*s.* 9*d.* for broken. At the sale on the 22nd., 22 packages of West Indian were offered and sold at easier rates, fair to good pale fetching 2*s.* 1*d.* to 2*s.* 2*d.*, and ordinary red 1*s.* 10*d.* to 1*s.* 11*d.* No other kinds but 'Wild Bombay' were quoted at these sales and the whole of this was bought in. Pimento was represented at the early sale by 113 bags which sold at 2⅜*d.* for fair mixed blacks and 2½*d.* for full fair, prices which changed but very little throughout the month.

WEST INDIAN DOG-WOOD.

The Dog-wood tree *(Piscidia Erythrina)* is commonly found in the West Indian islands and other parts of tropical America. It attains a height of about 20 feet ; the leaves are pinnate ; the flowers are whitish with a purplish tinge ; the seed pods are winged. Though the timber is tough and elastic and used locally for carriage-work, the bark is probably the more interesting portion of the tree. From time immemorial the fresh bark which possesses narcotic properties has been pounded by the natives and thrown into shallow water for poisoning fish. This is a wasteful and cruel proceeding, forbidden by law in most British possessions. At Jamaica, for instance, any person who shall use any method of poisoning or intoxicating fish shall be guilty of an offence against Law 32 of 1885 and punishable, on summary conviction, with a fine or penalty, not exceeding five pounds.

The bark of the root of the Dog-wood tree is used medicinally and is regarded in the United States as a specific for tooth-ache. Recently some fine pieces of the roots of the Dog-wood have been received from Montserrat. In that island a decoction is prepared from the root bark and used to get rid of ticks, fleas, etc., on dogs and other domestic animals.

ARBOR DAY.

St. Lucia.

The following extract is taken from the Annual Report of the St. Lucia Agricultural Society for 1902 :—

At the suggestion of Dr. Morris, November 9, the King's Birthday, was adopted as Arbor Day for the colony.

Grenada.

The following notice appears in the Grenada *Government Gazette* for May 15, 1903 :—

The Grenada Agricultural Society having fixed June 24, in each year, for the planting of useful and ornamental trees throughout the colony, his Excellency the Governor has authorized the Curator of the Botanic Station to distribute plants free of cost for this purpose. Applications should be made at once to the Botanic Station to enable a sufficient number to be in readiness on that date.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 175 of the last issue.

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Agricultural News

Vol. II. SATURDAY, JUNE 6, 1903. No. 30.

NOTES AND COMMENTS.

West Indian Capers.

The ordinary caper used for the manufacture of sauce is derived from the flower buds of *Capparis spinosa* L., of the South of Europe. Four species and several varieties of *Capparis* have been recorded from Trinidad. Among these is a variety of *Capparis cynophallophora.* A plant of this has for several years been cultivated in the Trinidad Botanic Gardens. Referring to it in the *Bulletin of Miscellaneous Information* for April 1903, Mr. Hart writes:—'In July 1902, it was observed to be coming into flower, and the flower buds being recognized as very similar in appearance to the common caper, they were tasted and found to possess a similar flavour. A quantity was gathered and placed in vinegar with a view of ascertaining whether they would answer for table purposes as well as the ordinary form. They remained in vinegar for some six weeks, but could not be made to take on the proper taste, tenderness or odour. Boiling for a few minutes was then tried, afterwards placing them in fresh vinegar. The result has been entirely successful, and it would be a clever cook who could detect the difference between the Mediterranean and the West Indian product, either in appearance or flavour.'

We have already drawn attention to the West Indian capers in the *Agricultural News* (Vol. II, p. 84) and have expressed a doubt as to whether they could compete commercially with the Mediterranean product.

Spraying in Dominica.

Mr. J. Jones, the Curator of the Botanic Station, Dominica, informs us that a Merryweather steam sprayer has recently arrived in that island, imported by Mr. A. H. Frampton of the Bath Estate, for use against the scale insects on the lime trees. A description of a Merryweather portable spraying engine, together with an illustration of the machine at work in England, has already appeared in the *Agricultural News* (Vol. I, p. 249). The outfit at Dominica includes over 600 feet of ½ inch hose, extension pipes and Vermorel nozzles. A photograph of the machine at work accompanied Mr. Jones' letter.

◆

Cacao Disease in St. Lucia.

The cacao trees in St. Lucia have recently been suffering from the combined attack of a grub which barks the roots, and a fungus, *Diplodia cacaoicola* (see *West Indian Bulletin*, Vol. II, p. 190) which causes the branches to die back. Mr. George S. Hudson, the Agricultural Instructor, writes saying that he is combating these parasites by (1) high cultivation and manuring, (2) cutting back affected trees to suckers, (3) planting thick overhead shade which seems to restrain *Diplodia*, and (4) injecting bisulphide of carbon into the soil.

The object of the first measure is to increase the vigour of the attacked trees and so enable them to throw off the disease. Cutting back the affected trees will prevent the spread of the fungus further down the stems and, if the diseased parts be at once burned, will prevent the infection of healthy trees. The injection of carbon bisulphide into the soil has in view the destruction of the root grub.

It will be interesting to learn to what extent these remedies will prove successful.

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Mosquito Plants.

According to the *Pharmaceutical Journal* of May 9, a specimen of the 'mosquito plant' *(Ocimum viride)* has been brought from Northern Nigeria to Kew, where it may be seen growing. The odour of the leaves of this plant is said to be very efficacious in driving away mosquitos from a room in which a growing plant is placed. The odour resembles that of eucalyptus and wild thyme. The natives of Nigeria are said to use an infusion of the leaves in place of quinine for malarial fever.

Sir George Birdwood, in *The Times*, points out that allied 'basils' have been used by the Hindus as a defence against mosquitos from time immemorial, and the allied species, *Ocimum micranthum*, is similarly used in the West Indies.

Mr. J. R. Bovell, the Superintendent of the Botanic Station, Barbados, informs us that seeds of *Ocimum viride* were received at the station from Sierra Leone by the mail of May 25. The seeds have been sown, and it is hoped that it will be possible to raise some of these 'mosquito plants' in the West Indies

Kola Nuts.

With reference to the note that recently appeared in the *Agricultural News* (Vol. II, p. 151), Mr. W. Fawcett, F.L.S., the Director of the Botanical Department at Jamaica, has been good enough to communicate the fact that, according to Dr. Preuss *(Jamaica Bulletin*, 1900; pp. 154-6), the Kola tree found in that island is believed to be *Cola vera* and not, as hitherto supposed, *C. cauliflora*. This is very interesting and we hope, if the fact be established, that it will serve as a means of bringing Jamaica Kola nuts more prominently into notice as likely to be superior to those usually obtained from the West Coast of Africa.

* * *

Cotton Seed Industry in India.

We learn from the *Board of Trade Journal* of April 2 that according to a report of the Upper India Chamber of Commerce, there is a possibility of establishing a cotton seed oil industry in India. At present about 2,000,000 cwt. of seed is exported annually from that country. Experimental crushings in America have shown that, contrary to the general belief, 'the seed was very rich in oil,' and that 'the same process would be necessary and sufficient to produce oil in India as in America.'

If the cotton industry become firmly established in the West Indies, growers will have to consider whether it will pay them better to crush the seed at home or to export this to England or America and then import the oil and oil-cake manufactured from it from these countries.

* * *

Ripe and Unripe Honey.

The results of some experiments in Canada, to ascertain what difference in composition might exist between honey taken from uncapped and capped comb, are given in the *Report of the Experimental Farms* for 1902.

The experiments in 1901 showed that 'the honey from the fully capped comb contained from 4 to 5 per cent. less water than that from the partially or entirely uncapped comb.' Moreover 'the honey from uncapped and partially capped comb was found to have decidedly poor keeping qualities compared with the fully capped comb.'

In 1902 the difference in water content is reversed, as the honeys from fully capped comb 'contain somewhat the higher percentages.' It is thence concluded that 'evidently the character of the season has an influence on this matter and it is quite possible that, in some seasons, the honey from uncapped comb may be practically of equal quality to that from capped comb.'

Experiments are now in progress to test the effect of dry and moist air, respectively, on extracted honey.

The Work of Travelling Instructors.

Mr. George S. Hudson, the Agricultural Instructor at St. Lucia, contributes the following interesting information on the result of his work in that island:—

'Roseau experiment cacao plot (one acre) was visited on April 2. Its condition is satisfactory, the crop reaped for the past year being 630lb. of dry cacao, as against 270 lb. for last year and *nil* the year before the Department took the plot over. I estimate there are 150 to 200 lb. (dry weight) of cacao still on the trees and the prospect for the coming crop is excellent.

'On March 1, I attended a meeting of the Dennery branch of the Agricultural Society and addressed those present on the use of artificial manures for cacao. I have imported and distributed twenty-six lots of such manures to peasant proprietors, each lot being sufficient for ⅛ of an acre. This must give good results and encourage forking, pruning and high cultivation, generally, in ever widening circles.

'I am pleased to report that, on my visits to Rivière Dorée district, I observed an increasing area devoted to cotton by peasant cultivators.'

* * *

Utilization of Beet Sugar By-products.

The utilization of the by-products from beet sugar manufacture has lately come to be a very important part of the beet sugar industry of America. The *Sugar Planters' Journal* of May 2, 1903, publishes the gist of replies from a number of central factories of which inquiries were made. It would appear that, besides being manufactured into alcohol, molasses is sold to dairymen and farmers and used as cattle feed either alone or mixed with other materials. Beet pulp is also largely used for stock feeding purposes, and is stated to be 'one of the best milk producers known.'

* * *

Vanilla in the Comoro Islands.

The following extract, dealing with the cultivation of vanilla in the Comoro Islands (lying midway between Madagascar and East Africa), is translated from an article in the *Bulletin de la Societe d'Etudes Coloniales* for April 1903, entitled 'L'agriculture aux Comores':—

'The most profitable crop is vanilla. The first plantations date back ten years, having been started at Anjouan in 1893. At present there are more than 70,000 vines in cultivation, which yield about 40,000 kilograms (about 90,000 lb.) of prepared vanilla yearly. In Comoro vanilla can be cultivated up to a height of 800 metres (over 2,500 feet) above sea-level, it is usually trained on "pignon d'Inde," which are forced to branch by cutting the ends when the plants are about six months old. The vanilla is planted at the foot of supports, the slips are from 20 to 40 inches long, and three or four nodes and internodes are buried in the soil. The plants yield fruit in the third year. The pollination is carried out by women and children, and the flowers which are not fertilized are removed.'

INSECT NOTES.

Flea Beetles.

Amongst the beetles injurious to cultivated plants, one family is popularly known under the above name from their small size and great powers of leaping. They are generally distributed and several have been recorded in the West Indies on various plants. The habits of the group vary but little; the larvae frequently mine in the tissues and are little known, being hidden from sight. On emergence the beetles live on the leaves, eating the epidermis or even eating small holes. The commonest species here occurs on the sweet potato; it is a small, shiny, black beetle *(Chaetocrema amazona)*, abundant in sweet potato fields. The damage seldom amounts to much, even though large numbers of these insects may be present, but they form one of the many pests that help in weakening the plants and now and then cause a very great diminution in yield.

Another *(Epitrix parxula)* is found on the egg-plant, eating small holes through the leaves. This species is known and may easily be found on the broad leaves of this plant. A third is common in Antigua on the Barbados Cherry; the curious appearance of the leaf when these beetles eat off the epidermis is very characteristic and the small beetles, coloured red and steel blue, can be seen running actively and then jumping off to another leaf. Our species seem to be rarely, if ever, destructive enough to call for remedies. In the United States, Bordeaux mixture is found to be effective against them; in Barbados the application of lime and sulphur to sweet potatos has been found to check them materially.

As an interesting group, they repay study and can easily be recognized. As possible pests, they should be familiar to planters and gardeners, who would then recognize their peculiar habits and methods of attack in case of their proving destructive.

The Vitality of Seeds. An account of a trial shipment of Castilloa rubber seed is given in *Indian Gardening and Planting* for November 27, 1902. Two thousand seeds were sent from Paris to the Botanic Garden, Peradeniya, Ceylon, packed, in leaf-mould, in four small tin boxes. The boxes were opened six weeks after packing, and it was then found that 387 seeds were fully germinated; 168 had split and were beginning to germinate; 169 seeds were good but had not split; 1,248 seeds had been destroyed by bacteria, etc., and were useless. This gives a proportion of 37 per cent. of good seeds and 63 per cent. of bad. The leaf-mould used would not form a good packing material as it usually contains numerous bacteria, fungus spores, etc.: probably sterilized sand would have proved better. The Castilloa seed possesses no hard protective coat and is therefore unsuited for travelling.

CULTIVATION OF SUNFLOWERS.

In a previous issue of the *Agricultural News* (Vol. II, p. 28), the Curator of the Botanic Station, Tobago, reported that, at a stock and poultry farm in that colony, sunflower seeds were imported from America for feeding poultry, and he suggested that the cultivation of sunflowers would be a profitable industry if taken in hand and the seeds used locally. With a view to giving some idea of the great commercial value of sunflower seeds, and the utility of the plant itself in improving the unhealthy conditions of swampy and malarial districts in tropical climates, we reproduce the following interesting notes from the *Gardeners' Chronicle* of May 2 last:—

The sunflower plant comes originally from Mexico; its reputation is world-wide. Its cultivation, when grown on a large scale, is much the same as that for mealies. By planting 5 ℔. weight of seed to the acre—broadcast or ridge, 18 cwt. of good clean seed will return in four months, with ordinary cultivation on average land; from this, 300 ℔. of oil can be pressed, or 18 per cent. of the weight harvested.

On average land the crop is fifty bushels to the acre, averaging one gallon of oil to each bushel yielded. In the fertile valleys around Barberton, from 15 to 20 per cent. can be added. Samples of seed-crowns were exhibited at Barberton in 1894 which measured 21 inches across.

The oil yielded from the ripe sunflower seeds is of great commercial value; it is superior to olive and almond oils for table use; for frying fish it is unequalled. For burning in lamps, it lasts longer and gives a brighter light than any oil; for paintings (greens and blues) it is the most brilliant; in high-class scented soaps it is the most valuable, on account of softness; it makes the best wax candles; as a drying oil it is equal to linseed; it is the best-known oil as a lubricant. A farmer can increase his income from £50 to £100 a year by growing sunflowers in every odd nook and corner, and keeping bees. Here again it supplies the wax. The yellow flower is a fast dye. In manufacturing the most expensive woollen cloths, sunflower oil establishes the finest gloss.

The stalk produces fibre as fine as silk and as coarse as flax, as required, in large quantities. Since rags have become scarce, the fibre is used for paper-making. When the oil is extracted from the best seeds, the residue, together with the 80 per cent. above mentioned, is again crushed into a mash or oilcake, which sheep, pigs, pigeons, rabbits, poultry, and horses will fatten on rapidly. The green leaves when ripe make a fine fodder, if mixed with bran, for cows. Feeding fowls on bruised sunflower seed is said to increase their laying powers. The pith is used by surgeons, also the oil for demulcent and soothing purposes.

In *Tropical Cultivation*, Ceylon, 1889, we read: 'In swampy places, where intermittent fevers are common, the cultivation of sunflowers on a large scale has been found effectual in remedying, and in some cases altogether destroying, the fevers peculiar to marshy districts in tropical climes.'

Mange in Dogs. The following application for mange in dogs, a troublesome disease in the tropics, is recommended for trial: Soft soap, 4 parts; B-naphthol, 1 part; storax, 2 parts; tobacco extract, 3 parts. To be applied to one-third of the skin, at the most, for three consecutive days. After three applications, wash the whole body, using carbolic soap.

CACTI.

It is a well-known fact that plants, in order to live, require a constant supply of water. This water in the case of our ordinary plants—ferns and flowering plants—is taken up from the soil by the roots, is passed up the stem to the leaves and thence transpired into the surrounding air. With this water are taken up mineral salts from the soil which serve as plant food.

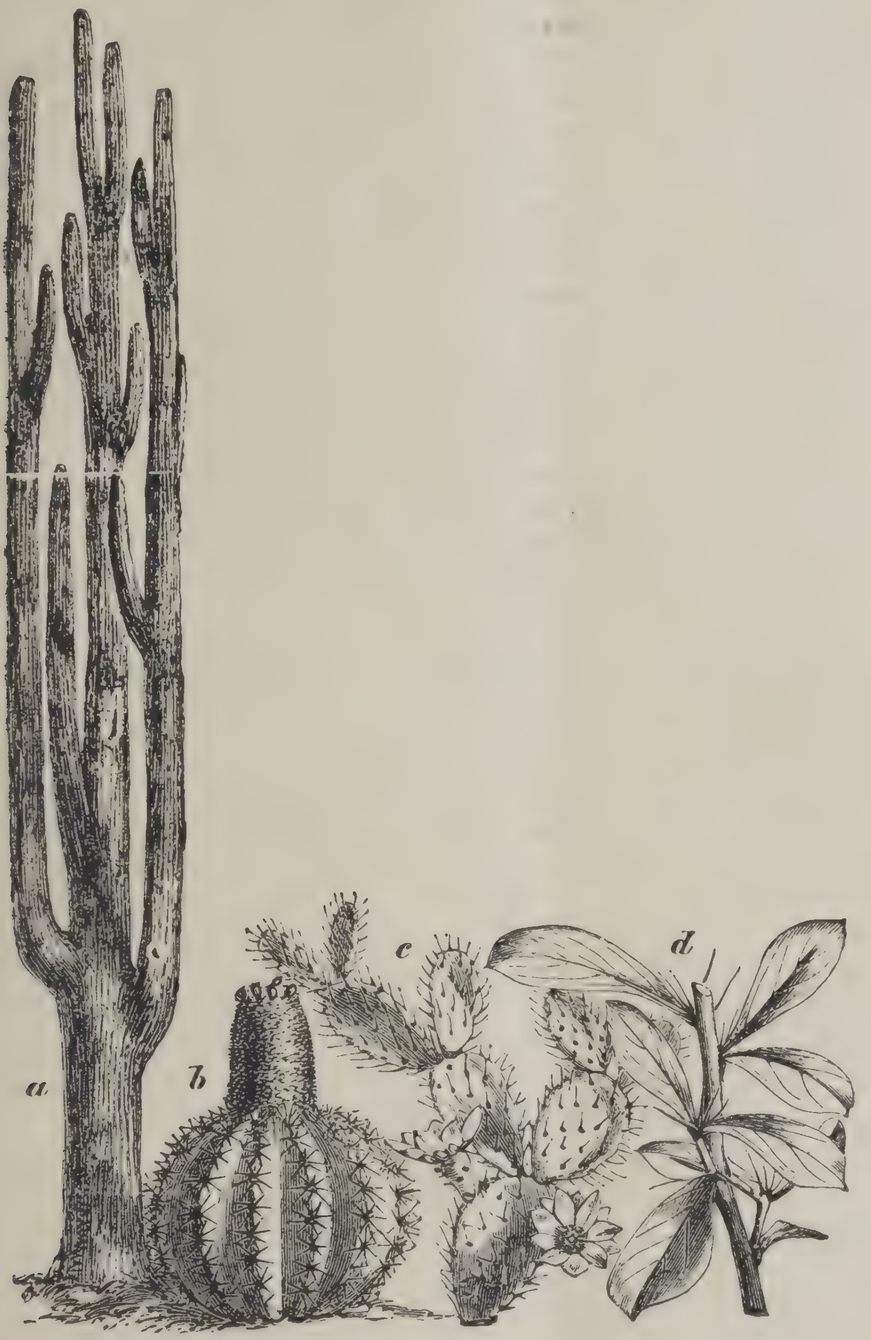


Fig. 13. GROUP OF CACTI.
(From the *Kew Guide.*)

Plants, however, have adapted themselves to live under most varied conditions of water supply. Some live in places where the air is always nearly saturated with water vapour so that transpiration is reduced to a minimum, while others are found in deserts of both the Old and New Worlds, where rain hardly ever falls and where the air is always dry and hot—conditions which render the loss of water very rapid indeed.

The Cacti (Fig. 13.) form a very good example of this last group of plants *(xerophytes)*. The curious shapes they assume are adaptations to meet the requirements of their environment, the object being to present as little surface as possible from which water can be transpired. The leaves, which in ordinary plants are the transpiring organs, are absent from nearly all Cacti, and the stems take on all the functions usually performed by the leaves. These stems are always thick and fleshy so as to present the smallest amount of transpiring area. This is, of course, most perfect in the spherical and cylindrical forms (Fig. 13, *a* and *b*).

The cuticle (skin) of the stem is very thick and is impervious to water vapour, so that the only spots whence water can escape are the breathing pores (stomata) and these are much reduced in number. The internal part of the stem is largely composed of thin-walled tissue, which serves to store water. The contents of this tissue are usually mucilaginous, thus further obstructing transpiration.

The Cacti are nearly all natives of the dry regions of tropical America, only one form is found native in the Old World, but several species have been introduced into Africa and Australia and have become very troublesome weeds.

GROUND NUTS IN THE UNITED STATES.

The following facts and figures regarding ground or pea nuts are taken from *The Southern Planter* for May, 1903. Though primarily intended for the use of planters in the southern States, the hints, as to cultivation, etc., should prove of service to growers of ground nuts in the West Indies. An article on the ground nut, its cultivation and possibilities, has already appeared in the *Agricultural News* (Vol. I, p. 136):—

The demand for these nuts has been good, prices are better than for some years past, and the stocks held by dealers are, we are told, small. This would indicate a good demand for the next crop, as the consumption is a growing one both for domestic use and for oil and feeding purposes. We are strongly of opinion that, if better methods of preparation of the land and a better system of rotation were followed and more consideration were given to the requirements of the crop in the way of fertilizers, much heavier crops would be grown than the average now raised. The crop is an important one in Eastern Virginia and North Carolina, and the land well suited for its production, but in many sections they have been too long grown on the same land without a rotation of other crops. According to the census reports, the area devoted to growing pea nuts in 1899 in Virginia, was 116,914 acres, and the product was 3,713,347 bushels, the average yield per acre being 31 bushels. In North Carolina, in the same year, 95,856 acres were devoted to the crop, and the yield was 3,460,439 bushels, the average yield per acre being 36 bushels. These yields are too small to be profitable, and fall far short of what can easily be made. Fifty bushels to the acre can readily be made by planting in a proper rotation and by fertilizing scientifically. One hundred bushels per acre have been frequently grown. Too often the practice is to follow pea nuts with pea nuts, year after year, until the land will not produce a crop worth gathering. At best, the only rotation is pea nuts followed by corn, and then by pea nuts again. This is too short a rotation. A more profitable way would be to grow cow peas or soy beans, and then follow with pea nuts, and after this crop plant sweet potatos. A dressing of 300 ℔. to the acre of acid phosphate should be applied to the cow pea crop, and a mixture of 100 ℔. of acid phosphate, 300 ℔. of cotton seed meal, and 65 ℔. of muriate of potash, or 30 ℔. of kainit to the acre should be applied before planting the pea nuts. A dressing of 25 bushels of lime to the acre should be given every three or four years. We are satisfied that, if such a system as we suggest be followed, it will result in a much heavier average yield of nuts and the fertility of the land will be maintained and enhanced.

POULTRY.

External Parasites of Poultry.

Leaflet No. 57, published by the British Board of Agriculture, deals in a very complete way with these pests of fowls. The following is a brief summary of the leaflet:—

The external parasites of poultry are of three general kinds, (1) Fleas, (2) Lice, and (3) Mites.

1. There is only one species of flea that attacks the fowl and it does this in the mature form, which is a wingless, six-legged insect with piercing and sucking mouth parts. It attacks the fowls at night and, on this account, is not generally noticed. Dirt and dust on the floor and in the nests furnish it with breeding places.

2. There are eight distinct species of lice attacking fowls and these all agree in having biting mouth parts, thereby differing from the lice which prey upon human beings, which have sucking mouth parts. They live upon the products of the skin and fragments of the feathers. Frequently the feathers are seen to be notched and ragged as a result of their eating. These pests breed in the down feathers of the birds.

3. Mites are not true insects, as are the fleas and lice, but when fully grown have four pairs of legs. They are very minute. There are several kinds of mites attacking fowls, the most injurious of which is the red or common fowl-mite. This is a very minute creature that attacks fowls at night and so frequently escapes notice. Emaciated or dejected looking birds should be examined at night and, if found to be infested, should be treated at once. This pest multiplies rapidly and causes great injury both by the irritation it produces and by the loss of blood which it sucks from the fowls. The so-called 'Depluming Scabies' is another minute parasitic mite, which lives at the base of the feathers. Here it causes such irritation to the skin that the fowls, in their attempt to relieve this, pluck out the feathers, the pest thus producing the habit of feather-eating. Scaly leg is caused by another parasitic mite which burrows under the scales of the feet and legs and causes these to be raised and separated, and a chalk-like excretion accumulates around and over them.

PREVENTION AND REMEDIES.

Thorough cleanliness is the best prevention. Houses should be white-washed: to each gallon of lime wash, $\frac{1}{4}$ lb. soft soap should be added. Dust baths should be provided and Persian insect powder (pyrethrum) should be dusted in the nest.

Remedies vary with the pest. For fleas, lice and some of the mites white precipitate is a complete remedy and should be well rubbed in among the feathers. Some care should be used, however, as this is a strong irritant poison. For the itch-mite or 'Depluming Scabies' oil of cloves or, better, one part creosote with twenty parts lard or vaseline, well rubbed in, is the best remedy. For the scaly-leg mite this latter remedy is advised, after the crusts have been carefully removed. In dealing with these last two pests the isolation of the infested bird is essential.

HOME MADE JAMS.

The following recipes taken from a recent issue of the *Tropical Agriculturist* (November 1902) are by a 'mem-sahib' in India and may be of interest to housekeepers in the West Indies as affording a welcome addition to the preserves usually made in these islands:—

Green Mango Jelly: Peel, cut and stone the fruit. Put each piece, as cut, into water slightly acidulated with lime juice or it will discolour. When all is cut up fairly small, drain, dry and put into a preserving pan, with just enough water to cover it. Put on the lid, and let it simmer, as for guava jelly, but the fruit being green takes much longer to get soft and squashy. When quite pulpy let it drip through flannel, but do not squeeze it at all. Weigh the juice, allow $1\frac{1}{2}$ lb. of sugar to every pound of juice and boil together till it jellies.

If made from ripe mangos, only use $\frac{3}{4}$ lb. of sugar to each pound of juice, and the first boiling will not take very long. When cutting the ripe fruit, too, do so over the preserving pan, to save all the juice, and do not put the pieces into water until you are going to boil them.

Jam from green or ripe Mangos: These are made alike, only the green wants more sugar. Grate or cut up the fruit after peeling and stoning it. Boil gently till quite soft or pulpy, and all in a mash; if preferred, it can be put through a sieve. Weigh, and to every pound of green mango pulp allow $1\frac{1}{4}$ lb. of sugar. If ripe fruit is used allow only $\frac{3}{4}$ lb. Simmer gently till thick.

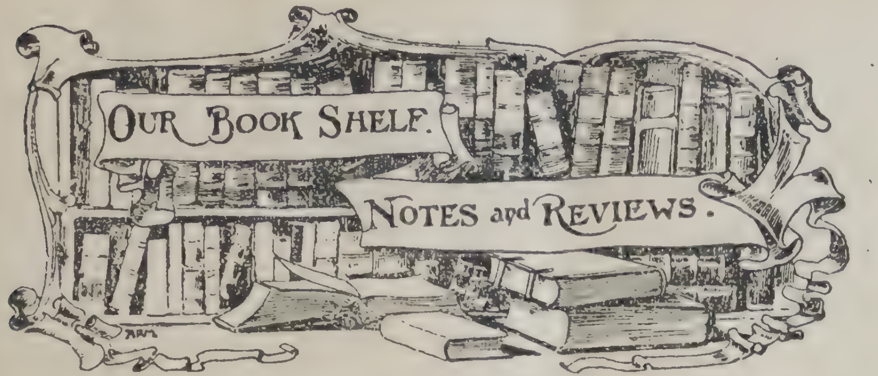
Plantain Jam: This is much liked by children and is easy to make. The fruit soon softens with boiling. I always sieve it. Add $\frac{1}{2}$ lb of sugar and the juice of two limes to every pound of pulp. Boil together till firm; it often turns quite a pretty pink.

Plantain Jelly: Take about 30 large, coarse, very ripe plantains, wash them well; add 4 pints of water and boil for two hours; uncover; strain, but do not squeeze. To eight cups of the juice allow five cups of sugar and the juice of three limes; boil until it jellies. It is not clear, but a nice red colour. If a few guavas, about six big ones, are added to the plantains and all boiled and strained together, it makes a nice variety.

Tomato Jelly: To each pound of tomatos allow 2 oz. sugar. Melt the sugar, stirring all the time, taking care it does not burn. Into this put two or three Bombay onions cut up very fine, for each pound of fruit, and boil up nicely. Add the tomatos cut up fine, a little pepper and salt, and if liked, some spice. Boil all to a pulp, strain, and then boil up the juice till it jellies. Put into *small* pots, as it does not keep well when once opened. This is a savoury for use with meat, which is not much known.

Two Uncommon Passion Fruits. Mr. Waby in *Tropical Gardening*, p. 110, refers to the Bat's-wing passion flower *(Passiflora vespertilio)* as yielding a fruit about the size of a large cherry, purplish-black when ripe. The skin is said to peel off quite freely from the pulp, which is much sweeter and with a better flavour than the bell apple or water lemon.

There is another passion fruit that is edible This is known in Barbados as the 'wild water lemon' and 'love-in-a mist' *(Passiflora foetida)*. It is being grown in Government House gardens and the fruit, although very small, is sweet and pleasant. It somewhat resembles the Cape gooseberry *(Physalis)*. Seeds of this interesting but little known passion fruit, kindly presented by Lady Hodgson, have recently been distributed by the Department.


OUR BOOK SHELF.
NOTES and REVIEWS.

FUMIGATION METHODS. By Willis G. Johnson; *New York: Orange Judd Co., 1902.*

This is a practical and comprehensive treatise on the use of hydrocyanic acid as a remedy for insect pests in the field, in mills, granaries and dwelling houses. Professor Johnson gives the history of the use of this substance, the difficulties met, and tells how they have been overcome.

Full directions are given for fumigating with hydrocyanic acid and with carbon bisulphide. The book is also well illustrated. There are chapters on the 'Laws regulating Nursery and Orchard Inspection and Fumigation.' On the whole the book is an admirable exposition of the subject by one of the men best qualified to write upon it.

QUEEN OF FLOWERS.

With reference to the occurrence of this tree at Barbados and the difficulty of obtaining seedlings from it (*Agricultural News,* Vol. II, p. 170), Mr. C. K. Gibbons of Collynns, St. Lucy, writes:—

I succeeded last year, after many years of failure, in obtaining more than a hundred seedlings from my tree here and offered them in exchange for other plants (*Agricultural News,* Vol. I, p. 94). Unfortunately I met with no replies; unfortunately, because during my absence one day, an over-zealous servant destroyed every seedling by a liberal application of strong manure water. Three seedlings, of a number given away before the catastrophe, are still growing in this island. I have been successful, to a less extent, this year and now have about 40 seedlings, some of which I should be pleased to give to your correspondent as soon as they are strong enough to be transplanted. The seeds, in both years, have taken two to three months to germinate, and I have only succeeded by sowing them in 'land sand' kindly given me by Dr. Moore. The seedling is attacked, as soon as the first leaves appear, by an aphis and, if not daily examined and the aphides gently removed with a camel hair brush, will very quickly be destroyed. I have found ordinary insecticides too strong, but have been successful this year with a weak solution of soap in water, to which was added a few drops of kerosene oil, the whole being well shaken together.

Medicinal Properties of Honey. F. Silvestir has investigated the effects of the honey of certain species of South American bees. He states that that of *Trigona rufricrus* is purgative; the honey of *Trigona limas* is very effective when applied locally for rheumatic pains, but that taken internally it is sometimes toxic, causing gastric pain, fever and even paralysis. The honey of *Trigona duckei* has a well established reputation as a remedy in eye diseases.—(*Pharm. Central.,* 43, 476).

TREATMENT OF ORCHARD SOILS.

Among the papers read at the Agricultural Conference held at Barbados in January 1901 was one on the 'Treatment of soils in orchard cultivations in the Tropics.' The question being of a practical nature there was naturally some difference of opinion as to the proper methods to pursue. While some claimed to have obtained good results from leaving the land undisturbed and allowing grass and weeds to grow between the trees (subject only to periodical cutting back with the cutlass), others inclined to the opposite view and recommended special attention to tillage and the eradication of all weeds, and especially grasses. In view of the uncertainty which at present exists with regard to the treatment of the land in orchards, the following, summarized from the *Report of the Woburn Experimental Fruit Farm* for 1897, may be of interest to cultivators in these islands:—

Referring to the effect of grass around trees, the report states that the experiments in this direction were of an extremely useful and practical character. In the case of fruit trees the grass-grown plots showed a reduction in the size of the leaf ranging from 35 to 41 per cent., in growth of wood from 74 to 87 per cent., while in the case of fruit production the yield was reduced by 71 per cent. in weight and 82 per cent. in value, showing that there was a deterioration of the size as well as of the quality of the fruit. The plots on which other weeds only were allowed to grow showed the ill effects to a less degree, amounting in the case of leaf reduction to 28 per cent., and in wood growth to 62 per cent.

The report goes on to say that the fact that grass round trees has a worse effect than other weeds is perhaps to be expected, when it is remembered that grasses are perennial and that most weeds are annuals, the latter being, therefore, operative during a limited period of the year. It is possible that the trees planted in grass may, as appears to be happening in other cases, recover after a few years part of their lost vigour, and it is possible, also, that the sowing of grass round older and well-established trees might have but a small effect on them; but, as regards newly-planted trees, the present results can leave no doubt but that grass round the roots is, with the exception of total general neglect, the most disastrous method of treatment which can be adopted, at any rate in a dry season, and, even if it lead to no other ill-effects, must result in a retardation of growth equivalent to several years of the trees' lifetime, with a corresponding loss of time and money.

AGRICULTURAL SHOWS.

Dominica.

Mr. A. K. Agar, the Secretary of the Dominica Agricultural Society, reports that a local Agricultural Show was held at La Soye in that island on February 7 last. This is the second Annual Show held in this district and was initiated by Mr. F. E. Everington. The Dominica Agricultural Society gave a grant of £2, and prizes of agricultural implements were given by various business firms in Roseau. The total number of exhibits was 611, and their quality was far in advance of those at the previous show. The exhibition was a great success and was much appreciated by all classes at La Soye.

GLEANINGS.

Implemental tillage on sugar plantations and changes in the system of coolie immigration are subjects receiving keen attention in British Guiana at the present time.

The *Sugar Planters' Journal* of April 4, states that the latest statistics secured by Willet and Gray from the American beet sugar factories show that 195,463 long tons of sugar were manufactured last season, as against 163,126 tons the previous year.

The so-called Zwenga or Japanese sugar-cane, says the *Louisiana Planter and Sugar Manufacturer* of April 4 last, is being successfully cultivated in Florida. This cane seems especially suited to sandy soils, and is said to be a hardy and prolific grower.

A correspondent writing to the Jamaica Agricultural Society on the disease of cabbage states:—

'The so-called disease is caused by people using new stable manure and horse dung; the cabbage tribe cannot stand the above manures under a year old, and it should be stored in a shed and turned over now and then. Publish this and after a time you will cease to hear about cabbage disease.'

In Vol. I, page 276, of the *Agricultural News*, attention was drawn to the efforts which were being made at Dominica to instruct the boys of the Agricultural School in the method of curing vanilla pods for market. A trial shipment (5 ℔.) of these beans was recently despatched to Messrs. Brookes & Green, Brokers, Mincing Lane, London. The vanilla will be placed on the market in order to ascertain its actual value as an article of export.

At a meeting of the Linnean Society held on December 4, 1902, Dr. George Henderson called attention to the fact that the fertilizing power of leguminous plants was known to the Romans, who believed that these plants actually enriched the soil, especially if the roots were plentiful. It is remarkable that recent discoveries regarding the nitrification of the soil by the roots of Leguminosae should have been foreshadowed so long ago.

We mentioned in a previous number of the *Agricultural News* (Vol. II, p. 140) that, for the purpose of improving the breed of cattle at British Guiana, the Board of Agriculture had ordered, through the Department of Agriculture of Canada, three Holstein cows and a pure-bred, short-horn bull. The Barbados *Advocate* of May 26, states that the animals arrived at Georgetown by the s.s. *Oruro* and will be kept at the Botanic Gardens.

According to a correspondent, one of the beautiful herons wild in Grenada is being gradually exterminated.

According to Mr. H. Millen, the Curator, there are trees of the 'Claret' cocoa-nut palm at the Tobago Botanic Station. The nuts are much larger than those obtained from the ordinary tree. The name 'Claret' is applied to this variety on account of the colour of the top part of the young nuts when cut across.

In a standard work recently published on milk it is stated that it is desirable 'that as large an increase as possible in the use of goats' milk should take place, and this all the more because tuberculosis, a disease which is very widely spread among so many breeds of cows and which is communicable to mankind, *is unknown in goats.*'

According to Mr. J. H. Hart, F.L.S., the Superintendent of the Botanical Department, Trinidad, 'love vine' is the common name in that island for many species of *Cuscuta* and *Cassytha*, while 'bird vine' is the common name for several genera and species of the natural order *Loranthaceae*.

The Barbados *Advocate* of May 25, states that on Tuesday last (May 19) the schooner *Antonia A. Posible* arrived at Georgetown from Teneriffe with a cargo of 259,000 ℔. of onions. This should remind us that Demerara will offer a market for our onions (when they are grown) as well as for our sweet potatos.

The *Board of Trade Journal* for April 2, states that, according to a communication received at the Board of Trade from the Colonial Secretary of British Honduras, plans for the construction of light railways or tramways from the coast to some of the best crown lands in the colony are now under consideration and it is hoped that some of them may be carried into effect at no distant date.

Woodason's fluid vapourising bellows (large size) have been in use at the Grenada Botanic Station and have been found thoroughly effectual in clearing insect blights on tomato plants, etc., acting, as one gentleman described it, 'like a charm.' Kerosene emulsion was used. The cost of these bellows is 8*s*. 4*d*., and they may be had from Messrs. Peter Henderson & Co., 35 & 37 Cortlandt Street, New York.

According to the *Agricultural World* of May 2, beans form an excellent food for pigs, during the advanced stages of their fattening. Great care should be taken, however, not to feed beans too freely to pigs; they can only be given to advantage in somewhat restricted quantity and in combination with other foods.

Readers of the *Agricultural News* are informed that portfolios, half-bound, leather, marble sides, gilt-lettered at back, to hold a year's issue may be obtained at 2*s*. each. Also that Vol. I can be bound with title page and index, full cloth, at 2*s*. 6*d*. each; or half-bound, leather, marble sides at 3*s*. each. This is for binding only. All correspondence, in reference to the supply of portfolios and for binding the *Agricultural News*, should be addressed to the *Advocate* Printing Works, Prince William Henry Street, Bridgetown, Barbados.

HOW SUGAR-CANES ARE RAISED FROM SEED.

The following interesting account of the method adopted at Barbados for raising new sugar-canes from seed has been contributed by Mr. J. R. Bovell, F.L.S. F.C.S., Superintendent of the Sugar-cane Experiments connected with the Imperial Department of Agriculture. Mr. Bovell occupies a unique position in this matter as he was one of the first to take up the work and has been continuously engaged in it since 1889:—

In Barbados the panicles (arrows) are gathered as soon as the spikelets begin to be blown away by the wind, or as soon as a slight shake of the stem of the cane causes a few to fall. The panicles are then put into thin muslin bags and hung in a dry, airy place where a certain amount of sunshine is obtainable. At the end of a few days, when all the spikelets are readily detached, these are rubbed off and returned to the bags to dry for a couple of days longer. The seeds are then sown in well drained boxes of sifted garden soil, covered lightly with fine soil, watered, finally covered with sheets of glass and put under cover, where they can receive only a limited amount of direct sunshine. Usually at the end of the fifth day a few of the plantlets will be up. At the end of the second week, nearly all of those likely to germinate will have grown. The seedlings are then somewhat hardened by gradual exposure to fuller sunshine. By the end of the second month they are fit for transplanting, they are then pricked off into small pots and placed under racks on which sacking is put during the hotter time of the day to protect them from the full blaze of the sun. By degrees this time is shortened until they no longer need any shade. Three months from the time the seed is sown the plants are ready and ought to be taken to the fields. But in Barbados, owing to the dry weather at this time of the year, it is necessary to let them remain in the pots until the rainy season sets in. The seedlings are now allowed to go on growing until the following December when the most vigorous and largest clumps are re-grown from cuttings in comparison with one of the standard canes. In the December of the second year of their growth the canes undergo a second selection, based on their vegetative characters, a portion of the plot being kept for chemical analysis in the following reaping season. From now onwards the selection is based on the weight of the stems and the saccharine richness of each cane.

VOLCANIC DUST AT TOBAGO.

Mr. Henry Millen, Curator of the Botanic Station at Tobago, forwarded a sample of volcanic dust that fell in that locality on Monday, March 23, the day after the volcanic eruption at St. Vincent. There is little doubt that the dust came from the Soufrière. The sample was forwarded for examination to Professor d'Albuquerque, and Dr. Longfield Smith was good enough to report as follows:—

The volcanic dust from Tobago is composed of the same minerals as those present in the dust which fell at Barbados on March 22. The particles are almost all crystalline. In texture the dust is much finer than the Barbados dust, the average diameter of the particles being ·03 to ·08 mm.

EDUCATIONAL.

Grenada College.

Proposals are before the Government of Grenada for establishing a college at St. George's on the lines of the Royal College of Mauritius.

It may occur to many to inquire why it is considered necessary to go all the way to Mauritius for the model of a college to suit the circumstances of the West Indies, when there is already so efficient and satisfactory an institution existing in our midst as Harrison College at Barbados.

This, however, is not of material importance. The chief point is to secure that the proposed college shall afford a thorough and sound general education to boys who, for the most part, will remain in the island and be engaged in agricultural and commercial pursuits. Also it should enable some of the boys, who propose to enter professional life, to matriculate and obtain degrees in the Universities of the mother country.

In a report lately presented to the Government by a representative committee appointed by Sir Robert B. Llewelyn, K.C.M.G., the general recommendations are of distinct merit. We are glad to observe that the teaching of science is to form an integral part of the scheme. This can only be successfully carried out by securing the services of a competent master with experience in teaching science on modern lines, and by a supply of suitable apparatus and a laboratory. Nothing could be better than what is being done in this direction at Harrison College.

The recommendations by the committee in regard to science teaching are as follows:—

ELEMENTARY SCIENCE.

The committee recommend that elementary science should be taught in the Grenada College. In support of this proposed addition to the course of study obtaining in Grenada, they would urge that a grounding in science is becoming a matter of increasing importance, for the eminent reason that it prepares for studying agriculture—the island's only industry—in its higher branches, and for following it according to modern methods. Moreover, on the ground that rational knowledge has an immense superiority over empirical knowledge, science has a peculiar recommendation to be studied in Grenada, where empirical knowledge is over-valued, and agriculture is practised by men who believe much in tradition and little in science. Elementary science, however, should not be taught to a boy until he attain to a fairly high standard of general education, in order that the master may be enabled to ascertain the strong side of his ability for future specialization. It should also be practically taught, so as to relate it to the uses of life.

Lectures to Teachers at St. Vincent.

The first of a series of lectures on elementary agricultural science was delivered to the teachers of the St. Vincent primary schools, at the lecture room of the Agricultural School, by Mr. C. H. Knowles, B.Sc., the Resident Master Twenty four teachers attended the lecture, in addition to the student gardeners from the Botanic Station and the Assistant Master of the Agricultural School. The following subjects were dealt with on this occasion: the plant, the seed, germination. The lecture was illustrated by specimens and simple experiments.

ST. VINCENT.

Volcanic Eruption of March 22, 1903.

The following report, on some of the results of the volcanic eruption of March 22 on the cultivated areas in the Windward districts of St. Vincent, has been presented to the Government by Mr. Henry Powell, the Curator of the Botanic Station in that island:—

> I visited the Windward districts from the 27th. to the 31st. ultimo and beg to report as follows:—
>
> The layer of black dust from the eruption of the 22nd. ultimo was conspicuous on the Vigie and perceptibly increased in thickness onward to New Adelphi, but at the latter place the dust was not sufficiently deep to cause serious harm to provisions, etc.
>
> At Park Hill the layer had further increased in thickness, being about ½ inch, but no serious injurious effects were noticed here, nor are they anticipated, though the material had assumed a coarser nature and contained small pieces of a cinder-like appearance.
>
> From Three Rivers northwards, the dust was still coarser and contained many pieces of cinder-like ejecta an inch and upwards in size.
>
> The cacao trees at Mount William are very seriously damaged, the leaves being riddled with holes and mostly turned brown; the flowers on the upper sides of the branches are knocked off, but those on the under side are apparently little injured.
>
> The cultivation, generally, has a most depressing appearance, the layer of dust was about ¼ of an inch deep and did not appreciably increase in size or depth till nearing Georgetown.
>
> The layer of ejecta at the Experiment Station was about 1¼ inches deep and of a much more cinder-like and coarser nature than at Mount William. Pieces of cinder 3 inches and more in diameter were numerous.
>
> The sugar-cane plants, ground nuts, cotton, etc., under experiment here, as well as 2,000 to 3,000 young cacao plants in bamboo pots, are practically destroyed, and the intense heat caused by the sun acting on the ejecta has almost scorched up what vegetation the material in falling left.
>
> A special visit was paid to Dickson's Village. This village is in a valley, and previous to the eruption of May was well stocked with cacao, breadfruit and other useful trees; these all suffered serious injury in May and October but had since generally recovered and were again bearing fruit. The cindery material from the eruption of the 22nd. ultimo is about 2 to 3 inches deep and contains many cinders 3 to 4 inches in size. The leaves of the cacao and other trees are perforated and blasted: very serious injury has resulted to these, as also to bananas and general provisions. The road to Dickson's is over a considerable stretch of exposed land and, under present conditions, this village would appear a most undesirable place of residence. The villagers are much scared and nearly all who have been able have left for a safer place.
>
> The fields of standing sugar-canes at Mount Bentwick as well as the new foliage of the arrowroot somewhat relieve the eye, but, nevertheless, the damage done to these crops is apparent and real.
>
> At the Diamond arrowroot works about 2 miles from Georgetown on the Soufrière side, numerous pieces of ejecta somewhat resembling pieces of coke from gas works, 6 to 8 inches in diameter, fell. One of these crashed through the galvanized roof of the works. There are numerous punctures in the roof varying from the size named to minute nail-like holes. The depth of ejecta at this place was about 2½ to 3 inches.
>
> Further north, at the upper end of Langley Park, the pieces of coke-like material were more in evidence and the vegetation generally was blasted, the hardy groe-groe included.
>
> The inspection was continued north of Rabacca where the ejecta were still from 2 to 3 inches deep; they were composed mostly of smaller sized material than at the upper end of Langley Park.
>
> From Georgetown northwards the country presents the appearance of a huge blackened waste, as indeed it must remain for some time to come whether further eruptions occur or not.
>
> On account of its cinder-like nature and heat-absorbing properties, I regard the new layer of ejecta as about the worst that has yet fallen, though, fortunately, its depth is not as great as that of May or October.
>
> The nature and direction of the eruptive clouds indicate the perilous position of Georgetown and of the villages north and north-west of this town.

It will be observed that, outside the zone of destruction reached by former eruptions, comparatively little injury was caused on March 22.

It may be considered probable that the greater portion of St. Vincent, that is, a little to the south of a line drawn across from Georgetown to Chateaubelair will remain suitable for cultivation and be practically unaffected by eruptions of even the severest type that have occurred in historic times.

It would appear that within the southern area of the island the people at St. Vincent actually suffer less personal discomfort from the effects of the Soufrière than do the people of Barbados, 90 miles to the eastward. The last fall of dust in Barbados is still being blown about and is troublesome everywhere.

CORN BREEDING.

We have already drawn attention in the *Agricultural News* (Vol. II, pp. 113 and 126) to the possibilities of corn breeding. The following extract, taken from the *Sugar Planters' Journal* of May 2, gives an account of the way in which selection is carried out in the United States:—

> In breeding corn, a small field is used. The land is prepared and the seed bed treated as for the ordinary field. They are usually about 120 hills long and 30 rows wide. Each row is planted from a separate ear. The barren stalks, poor stalks and all undesirable stalks, such as suckers, are removed before the tassel appears. The field is protected or isolated, so that no mixture can take place from other varieties or from any source. In the fall, these rows are husked separately, and the seed for the next year's crop is selected from the rows giving the highest yields per acre, of best composition, with the least barren stalks, and of the best type. In this way, the yield per acre of the variety is increased, the quality improved and the type preserved and developed. By this plan, we are able to give personal attention and direct selection to the individual stalk and ear, which would be impossible in a large field. (From 'Marvels of Corn Culture,' in the May *Cosmopolitan*).

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—May 12, 1903.—Messrs. Kearton Piper & Co., Messrs. J. Hales Caird & Co., 'The Gardeners' Chronicle,' May 9, 1903, 'The Public Ledger,' May 9, 1903.

Aloes—Curaçoa, 14/6 to 40/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 1⅞*d.* to 4*d.* per lb.
Bees-wax—Jamaica, £8 to £8 5*s.* per cwt.
Cacao—T'dad, 60/- to 67/- per cwt. ; Jamaica, 51/- per cwt. ; Grenada, 52/6 to 58/- per cwt. ; Dominica, 53/- to 54/- per cwt.
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 34/- to 56/- per cwt.
Cotton—West Indian, $5\frac{7}{16}$*d.* to 5⅞*d.* per lb.
Fruit—
  Bananas—Jamaica, 3/6 to 6/- per bunch.
  Oranges—14/- to 18/- per case.
  Pines—2/- to 4/- each.
Fustic—No quotations.
Ginger—39/- to 68/- per cwt.
Honey—Jamaica, 40/6 to 58/- per cwt.
Isinglass—West Indian, 2/- to 2/5 per ℔.
Kola Nuts—1*d.* to 4*d.* per lb.
Lime Juice—Raw, 9*d.* to 10*d.* per gallon. Concentrated, £13 to £14 per pipe.
Logwood—£4 10*s.* to £4 15*s.* per ton. (Prices unchanged).
Mace—1/9 to 2/4 per ℔.
Nitrate of Soda—Agricultural, £9 7*s.* 6*d.* per ton.
Nutmegs—70's to 75's, 1/6 to 1/9; 80's to 90's, 1/2 to 1/4 per ℔.
Pimento—2⅝*d.* to 2⅞*d.* per lb.
Rum—Demerara, 9*d.* to 9½*d.* per proof gallon. Jamaica, 1/4 to 8/- per proof gallon.
Sugar—Muscovado, 12/6; Crystallized, 14/6 to 15/9 per cwt.
Sulphate of Ammonia—£13 10*s.* per ton.
Tamarinds—Barbados, 13/- per cwt. ; Antigua, 9/- to 9/6 per cwt.

New York,—May 1, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, $1.25 ; eight hands, $1.00 per bunch.
Cacao—African, 12¼c. to 12½c. ; Caracas, 13c. to 13¾c. ; Jamaica, 10¾c.; Grenada, 12c. ; Trinidad, 12c. to 13½c. per ℔.
Cocoa-nuts—Trinidads, $17.00 to $19.00 ; Jamaicas, $19.00 to $20.00 per M.
Coffee—Jamaica, fair to good ordinary, 5½c. to 6¼c. per ℔. ; Manchester grades 8c. to 10½c. per ℔.
Ginger—Jamaica, 7½c. to 8¼c. per ℔.
Pimento—4¾c. per lb.
Rubber—Nicaragua scrap, 67½c. to 68½c. per lb. Guayaquil strip, 62c. to 63c.
Sugar—Muscovado, 89°, $3\frac{3}{16}$c. per lb.; Centrifugals, 96°, $3\frac{11}{16}$c. ; Molasses, 89°, 3c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 20, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—20c. per gallon, package included.
Sugar—$1.47½ per 100 ℔.

Barbados,—May 23, 1903.—Messrs. T. S. Garraway & Co. and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb.
Cacao—$12.00 per 100 ℔.
Coffee—Jamaica and ordinary Rio, $8.00 to $8.50 per 100 ℔.
Hay—New Brunswick, 85c. per 100 lb.
Manures—Nitrate of Soda $60.00 ; Ohlendorff's Dissolved Guano $60.00 ; Sulphate of Ammonia $80.00 ; Sulphate of Potash $67.00 per ton.
Molasses—18c. per gallon, and $4.00 for puncheon.
Onions—Bermuda, $2.30 per 100 ℔.
Potatos, English—$2.63 to $3.75 per 100 lb.
Rice—Ballam, $4.60 per bag (190 ℔.) ; Patna, $3.50 per 100 ℔. ; Rangoon, $2.75 per 100 lb.
Sugar—In hogsheads. $1.25 per 100 ℔., and $5.00 for hhd. In bags, $1.50 per 100 lb.

British Guiana,—May 21, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8.50 to $9.00 per barrel.
Cacao—Native, 11c. to 12c. per lb.
Cassava Starch—$7.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica, 11c. to 11½c. per lb. (retail.) —Creole, 11c. to 12c. per lb.
Dhal,—$3.70 per bag of 168 ℔.
Eddoes—96c. per barrel.
Molasses—Vacuum Pan, yellow, 16c. per gallon, casks included.
Onions—3c. to 4c. per ℔.
Pea Nuts—Curaçoa, 3¾c. ; American, 5c. per lb. (retail).
Pigs—Young Boars and Sows, $5.00 each.
Plantains—20c. to 32c. per bunch.
Potatos, English—$2.75 to $3.00 per barrel.
Rice—Ballam, $4.70 to $4.75 ex store ; Patna and Seeta, $5.60 to $5.90 per bag.
  Creole Rice, 20c. per gallon (retail).
Sweet Potatos—Barbados, $1.00 per barrel.
Tannias—$1.08 per bag.
Yams—$1.92 per bag.
Sugar—Dark Crystals, $1.87½ to $1.92½ ; Yellow, $2.25 to $2.40 ; Molasses, $1.80 to $1.90 per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—Messrs. Gordon Grant & Co., May 21, 1903.

Balata—No quotations.
Cacao—Ordinary, $12.00 to $12.25 ; Estates, $12.75 to $13.00 per fanega.
Coffee—6c. to 6¼c. per lb.
Onions—$1.25 to $1.60 per 100 lb.
Potatos, English—$1.80 to $1.90 per 100 lb.
Rice—Yellow, $4.25 to $4.40 ; White Table, $5.25 to $6.00 per bag.
Sugar—Yellow Crystals for local consumption, $2.25 per 100 ℔.
  —Molasses sugar, $1.80 to $2.00 per 100 lb.

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[33.]

"CACAO."

BY

J. H. HART, F.L.S.

NEW EDITION.

A TREATISE ON THE CULTIVATION, CURING AND CHEMISTRY OF

COMMERCIAL CACAO.

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[50.]

NEW SEEDLING CANE.

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Present supply of plants exhausted. Orders now booked for 'Top' and 'Cane' plants for delivery next November. 50 cents per 100.

Analysis of Juice by Professor d'Albuquerque:—

	Stable Field.	*Lymphs Field.*
Specific gravity	1·0853	1·0848
Saccharose lb. per gallon ...	2·091	2·106
Glucose lb. per gallon ...	·048	·042
Solids not Sugar	·184	·163
Quotient of Purity... ...	90·01	91·13
Glucose ratio	2·29	1·99

RESULTS OBTAINED ON ESTATE.

30 clumps weighed 1,610 lb.
Equal to, per acre, (5x5) 41·75 tons.
30 clumps gave 112 gallons juice.
Equal to, per acre, (5x5) 6,500 gallons.
Very Strong, Large Grain Sugar obtained in Boiling House.

The Cane possesses a very hard rind and parts readily with its dry leaves.

Germinates Freely:
Ratoons Vigorously.

Apply to
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[33.]

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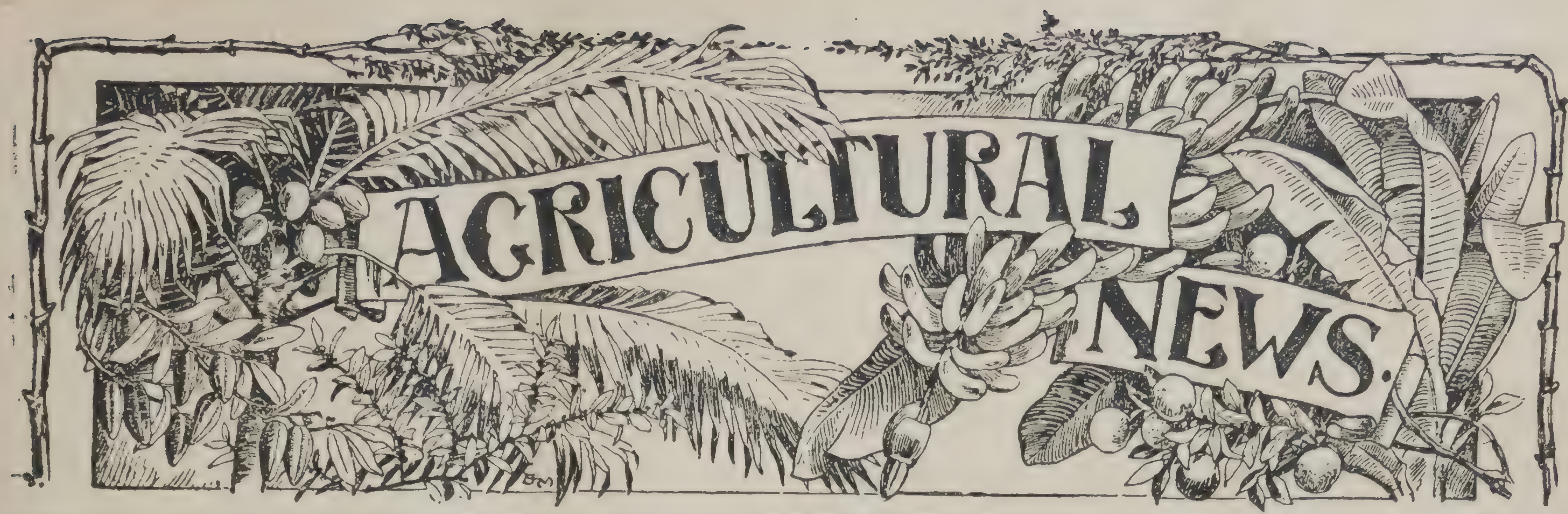

A FORTNIGHTLY REVIEW
OF THE
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Prevention of Plant Diseases.

MANY articles have already appeared in the *Agricultural News* and other publications of the Imperial Department of Agriculture on the subject of plant diseases, their prevention and treatment. We propose here to give a short general account of the methods in use, by scientific agriculturists, for the prevention of the introduction and spread of diseases, especially those caused by fungi.

The introduction of new plant diseases from countries known to be infected can be prevented by quarantine. This may take the form of prohibiting the importation of plants or parts of plants from any infected country. As an example of this, we may mention the measures adopted by many of the West Indian islands, forbidding the importation of cacao from the continent of South America (*Agricultural News*, Vol. II, p. 117), in order to prevent the introduction of the 'Witch-broom' disease. In less severe cases a quarantine of inspection is all that is needed; the suspected plants are kept under observation for a sufficient period, if found to be infected, they are burnt, if not, they are distributed. Then, again, seeds or cuttings which are suspected of carrying fungus spores are sometimes disinfected: with seeds, this is usually done by steeping them for some hours in ½ per cent. solution of copper sulphate (blue-stone).

These measures, though simple, are probably sufficient, if properly carried out, to prevent the introduction of fungoid disease from abroad. Prevention of a disease, which has already been introduced, is a much more difficult matter. A great deal depends upon a thorough knowledge of the habits of the pest, and it is also necessary that the action taken should be general and not confined to one or two of the more energetic of the community.

It is most important that whatever measures are to be taken, they should be taken in time. This can only be done by careful and intelligent watching of the crops and noticing the first symptoms of disease. Often, disease is not suspected until a whole field is in the last stages, and nothing can be done; whereas, if the disease had been noticed when it first appeared, it might have been stamped out.

Fungicides are often used as remedies for diseases: they should, however, be used rather as preventives. They are of most service in dealing with diseases of the leaves and fruit. When it is known that one of these diseases is likely to attack a crop, the leaves or fruits should be sprayed with some fungicide two or three times, while they are still young and before any sign of disease has appeared. The chief fungicides and the methods for their preparation are given in Pamphlet No. 17 *(General Treatment of Fungoid Pests)*, lately published by the Imperial Department of Agriculture.

It is universally recognized that when an animal dies of an infectious disease, its body must be either burned or buried, in order that it may not serve as a source of infection to healthy animals. The same holds good for diseased plants: all plants or parts of plants infested by fungus are possible sources of contagion. They should, therefore, be destroyed by burning or by burying them in such a way that they cannot serve as centres for the spread of the disease. This applies very strongly to the root disease of the sugar-cane, caused by *Marasmius*, which is so prevalent in Barbados this year. All old stumps and other parts infested with the white mycelium of *Marasmius* should be destroyed, and not left on the field in which a fresh supply of victims will shortly be planted.

The isolation of patients suffering from infectious diseases is one of the most efficient weapons used in combating epidemics. This is also one of the plant doctor's weapons, especially in dealing with root diseases. If only the disease is noted in time, isolation of the infected plants, by means of a trench, will probably confine the disease to the isolated area.

Rotation of crops is another method by which the spread of diseases can be prevented. In our last issue (p. 177) we drew attention to the value, in this respect, of crops which can be used to replace the sugar-cane.

One of the first cares of a doctor on attending a patient is to see that he is placed under sanitary conditions, in other words, under conditions which give his natural recuperative powers the best chance in their fight with the disease. The same holds good with plants; careful attention to cultivation, manuring, etc., of the soil will give a more vigorous crop, which will be far less liable to succumb to the attacks of fungoid and other parasites than a crop which has been neglected, and which is consequently in a low state of vitality.

Careless pruning and inattention to wounds, either natural or artificial, form points for the entry of many so-called 'wound parasites,' which often cause considerable, though easily preventible, loss with many of our crops.

Careful selection of disease-resisting varieties of plants is, perhaps, the most efficient weapon the plant pathologist possesses. This, possibly, can only be carried out thoroughly at experiment stations; but it is not difficult to tell which plants in a field suffer least from disease, and if seeds from these plants are alone used for sowing the next crop, a process of selection of resistant varieties will be carried out.

None of these methods which have been suggested are expensive, all are simple, and every one of them should form part of the ordinary routine of a plantation.

SUGAR INDUSTRY.

Varieties of Cane under Cultivation in British Guiana.

The following return showing the area under cultivation with varieties of sugar-cane, other than the Bourbon, in British Guiana, has recently been published by the Board of Agriculture of that colony:—

The following is a summary compiled from the returns rendered to the Sugar-cane Experiments Committee, in answer to its circular letter of January 3, 1903.

Varieties of canes other than Bourbon are being grown on 27 plantations in the County of Demerara, 8 in the County of Essequebo and 11 in the County of Berbice; or on 46 plantations in British Guiana.

Of these plantations, 35 have areas of more than one acre of one kind of variety under cultivation; 22 of them are in Demerara, 5 in Essequebo and 7 in Berbice. The remaining 11, 4 of which are in Demerara, 3 in Essequebo and 4 in Berbice, have only small areas of varieties of canes, which are used as nurseries to obtain canes for planting out larger areas.

Many of the plantations which are growing varieties of canes on a relatively large scale have nurseries of several or of many varieties, the cultivation of which they intend gradually to extend.

There are four plantations in British Guiana on which the Bourbon is the only kind of cane cultivated, and these are estates occupied as cane farms. One of these plantations is in Demerara, one in Essequebo, and two in Berbice.

The areas used for the experimental cultivation of the varieties other than Bourbon, on the estates participating in the inquiry, vary very greatly from 2 acres as the minimum to about 1,900 as the maximum.

One plantation in Demerara has an area of over 1,800 acres occupied by large scale experiments with varieties of canes, while one in Berbice has over 1,400 acres similarly occupied.

The following shows the various acreages devoted to these experiments:—

	Plantations in		
	Demerara.	Essequebo.	Berbice.
Over 1,800 acres	1	—	—
Over 1,400 acres	—	—	1
Between 800 and 600 acres...	2	—	—
Between 600 and 500 acres...	1	—	—
Between 400 and 500 acres...	2	—	1
Between 200 and 300 acres...	2	1	—
Between 100 and 200 acres...	8	1	1
Between 50 and 100 acres...	2	1	2
Under 50 acres	7	3	2

The returns show that in British Guiana 9,518 acres are occupied with large scale experiments in varieties of sugar-cane other than Bourbon, 6,859 acres being in Demerara, 2,132 in Berbice, and 527 in Essequebo.

The following table shows the varieties, other than Bourbon, which are at present being cultivated in British Guiana on areas of more than one acre in extent:—

Name or No. of cane	No. of plantations	No. of acres	Increased acreage on 1902
W. Transparent	27	2,786	887
D. 109	26	2,583	856
D. 78	21	846	217
B. 147	20	789	190
D. 145	19	644	202
D. 95	11	316	19 (decrease)
D. 74	14	225	9
D. 625	16	191	112
B. 208	14	151	108
Sealy	10	93	50
D. 115	10	84	12
B. 109	6	66	15
D. 116	6	58	23
B. 386	2	51	51
D. 130	5	38	30
P. Transparent	2	35	14 (decrease)
D. 1,897	1	32	32
D. 4,191	1	30	30
Burke	1	28	0
Red Ribbon	2	24	24
G. Transparent	3	20	15
D. 117	3	17	8
B. 156	3	10	4
D. 1,087	1	10	10
D. 1,959	1	9	9
B. 41	4	8	4
D. 4,415	1	5	5
D. 2,468	1	5	5
D. 1,880	1	3	3
D. 2,093	2	4	4
D. 1,483	1	3	3
D. 7,517	1	2	2

Sugar-cane Experiments at Antigua.

Mr. F. R. Shepherd, the Agricultural Superintendent at Antigua, recently reported that the reaping and grinding of the sugar-cane experiments would shortly be concluded. The scope of the experiments was as follows:—

Experiments with varieties of cane:—

(1) As plant canes ... ... 346 plots.
(2) As ratoons ... ... 292 plots.

Manurial Experiments:—

(1) With plant canes ... ... 136 plots.
(2) With ratoons ... ... 136 plots.

Mr. Shepherd adds that the experiments both with varieties and manures, for conclusion in 1904, are all in good order and progressing favourably.

COTTON.

Cotton in British Guiana.

The *Official Gazette* of May 27, published, by order of his Excellency the Governor, letters received from the Secretary of the British Cotton Growing Association, forwarding a report on some samples of cotton sent to the Association in March last.

The cotton was grown in Berbice, it was of two varieties, known locally as 'bush' and 'creole,' which are now growing wild on the coast lands of the colony.

The report is decidedly favourable and the Secretary states that a market could always be found for cotton of this class, and that it would always fetch a higher price than American. In his second letter the Secretary states that the Executive Committee is willing to guarantee its sale at ½*d.* per ℔. below the valuations and that they will be glad to receive as much cotton of this quality as could be supplied.

The expert's report on the cotton was as follows:—

No. 1. Very well ginned and prepared. Good length and strength, very like 'semi-rough' Peruvian cotton. Value, 7½*d.* to 8*d.* per ℔.

No. 2. Rather resembles very good Texas cotton. Very well ginned and prepared. Silkier than No. 1., but not so long in staple. Value about 6¼*d.* per ℔.

Inferior Cotton Seed Meal.

In the *Report of the Experimental Farms* of the Dominion of Canada for 1902, the Chemist states that attention was drawn, early in the year, to a brand of cotton seed meal which differed from that usually sold, being of a darker colour. It was purchased from the Florida Cotton Oil Co., Jacksonville, Florida, and is quoted at $3. to $5. per ton less than the ordinary bright meal.

Analysis showed this meal contained 17 per cent. less protein and 7·5 per cent. less fat than the average of cotton seed meal. The chemist concludes that 'it is evident that in the two most important constituents—protein and fat—the sample under consideration is very much inferior to that ordinarily on the market. Thus, calculating on the basis of equal values of the food units in the two kinds, we find that 1 ton of the ordinary cotton seed meal has a feeding value equivalent to 1 ton, 876 ℔. of the Florida Cotton Oil Co.'s meal.'

WEST INDIAN FRUIT.

THE SYMINGTON FRUIT SCHEME.

The following extract referring to the Symington Fruit scheme, particulars of which have already appeared in the *Agricultural News* (Vol. II. pp. 100 and 107), is taken from *The Voice of St. Lucia* for May 28:—

We have it on good authority that Mr. Symington's fruit scheme is ready to start. The company has been formed and the necessary capital raised. Mr. Symington will be out in the West Indies again shortly. He will then come to St. Lucia and tell us all about his project, which he was unable to do before, owing to his having been delayed at Trinidad longer than he anticipated, and it being absolutely necessary for the success of the project that he should be in England by a fixed date. We believe that the Royal Mail Company, which appears to be waking up under the new direction and management, will take an active practical interest in this undertaking, which, to be carried out successfully, must have the energetic co-operation of the company, the carriers, and the agriculturists of the lesser West Indies. A fruit business will be as potent an aid to the latter as it has been to those of Jamaica.

We take the following note, dealing with the same scheme, from the *West India Committee Circular* for May 25:—

The proposals of Mr. W. Weldon Symington for developing the fruit industry of the Windward Islands and Dominica, to which reference was made in the *West India Committee Circular*, No. 92, are now assuming a more definite shape. The Directors of the Royal Mail Steam Packet Company have promised to provide a regular system of exportation at moderate freight rates and to adapt certain of their ships so that the fruit shall reach the market in a marketable condition. They have also indicated willingness to take up shares in a company which is being formed to develop the scheme. Messrs. Cadbury and Rowntree are exhibiting a similar practical sympathy. It is proposed to established the company as far as possible upon a co-operative basis; £2,000 out of the first £5,000 required will be offered to the islanders and, in order that small holders as well as large may be associated with the movement, the company will offer to take up the amount of their meditated investment in fruit. We learn that Mr. Symington is leaving for the West Indies by the Mail on Wednesday next, to complete his arrangements.

USES OF THE MANGO.

A bulletin (No. 28), recently published by the Bureau of Plant Industry (United States Department of Agriculture), entitled *The Mango in Porto Rico*, gives some account of the uses to which the mango may be put. The chief use, of course, is as a fresh fruit, and it is stated that it deserves to become as common as the orange or banana. It is also mentioned that both ripe and green fruits may be canned and, as such, are much liked by some people. The preparation of mango jelly and marmalade is described and recommended, owing to the abundant supply and great cheapness of the mango in Porto Rico. Mango chutney is also mentioned, as is the fact that bruised and other imperfect fruit may be utilized to produce alcohol. The fresh fruit is stated to be slightly laxative and diuretic, while the unripe fruit is said to be one of the best antiscorbutics known, the dried and powdered kernel of the seed is used in cases of dysentery, and the unripe fruit, roasted and made into sherbet, is taken by the natives of India to prevent sunstroke. Various parts of the plant are used in India in dyeing, tanning and for pigments, while the gum which exudes from the trunk is said to be a substitute for gum arabic.

ARBOR DAY.

Jamaica.

The following notice is taken from the *Gleaner* of May 27:—

The Director of Public Gardens is prepared to make an allotment of seedlings of the trees named below to any church, school, or private individual who is prepared to plant them out on the day kept as Victoria Day: palms, Spathodea, *Cassia siamea*, juniper cedar, Eucalyptus, Grevillea, wild tamarind, Dillenia, Mahoe, Casuarina, sand box, Erythrina, etc.

The plants will be sent *free of charge* to the Parade Gardens, Kingston, or to any railway station, if applicants will state the number required.

Applications should be addressed to the Director of Public Gardens, Hope Garden.

ANNATTO.*

The following interesting information respecting Annatto appeared in the *Pharmaceutical Journal* (April 4, 1903) from the pen of Mr. John R. Jackson, A.L.S.:—

> Originally a native of South America, the Annatto plant, which is a graceful shrub or small tree bearing handsome white or pinkish flowers, has become widely distributed by cultivation in the East and West Indies, tropical Africa, and other tropical countries.
>
> The seeds form the most valuable part of the plant; they are contained in somewhat heart-shaped fruits, which burst when ripe, being then of a brown colour and covered with stiff, sharp prickles, somewhat similar to those of the edible chestnut, and serve as a very good illustration of protection or defence assumed by some plants. The seeds, which are small, have a coating of red waxy pulp, which gives commercial annatto. This is prepared by soaking the seeds in water till the colouring matter is separated, when it is strained off and evaporated to the consistency of dough or putty; it is then formed into rolls or cakes and dried, the former being known as roll, and the latter as cake annatto.
>
> The uses of annatto in European countries are quite well known, namely; for giving the pale yellow or fresh yellow colour to cheese, for heightening the colour of butter, besides which it is sometimes used in confectionery and in silk dyeing, as well as to give an orange colour to some varnishes.
>
> The seeds are imported into this country in large quantities, the various forms of annatto being a special branch of manufacture, with which some well known names have been long associated.
>
> The raw pulp from the seeds has astringent properties, while the seeds themselves are cordial, astringent, and febrifuge. The properties of the plant itself are astringent and slightly purgative, and it has a reputation in India in the treatment of dysentery and diseases of the kidneys.

TABASHIR.

An interesting specimen of a white, concrete substance resembling powdered quartz, known as tabashir or tabûsheer, and occasionally found as a deposit in the joints of the bamboo, was recently forwarded by Mr. Hart, the Superintendent of the Royal Botanic Gardens at Trinidad.

Dr. Walter H. Ince, formerly Assistant Government Chemist at Trinidad, states:—

> Tabasheer or Tabûsheer is a white, smooth, porcelain-like substance rarely found deposited in the knots of the bamboo, where it forms a saucer-like layer. Owing to the fact that this deposit occurs so seldom, valuable medicinal properties have been ascribed to it. The Indian population here use it as a specific against fever, malaria and ague. . . . . I find, however, after examining several samples that have been brought to my notice, that its composition varies very considerably. They all contain large quantities of silica, with indefinite quantities of iron, potassium and calcium. From this it would seem that the substance is not a definite silicate, but silica mixed with accidental quantities of various silicates.

Sir George Watt in his *Dictionary of Economic Products of India* thus refers to this very occasional product of the bamboo:—

> In the interior of the hollow stems of some bamboos, chiefly *Bambusa arundinacea*, a silicious and crystalline substance is found, known in the bazaars of India as Tabashir or Bamboo Manna. . . . It is an ingredient in many compound medicines which are given in many lung diseases. . . It seems probable that Tabashir is an after-product from the natural sap of the bamboo, which gives to young shoots their peculiar flavour. . . There are two varieties sold in the bazaars, a white and a bluish-white. Mixed with honey it is used locally in aphthae.

THE PRESERVATION OF EGGS.

Some experiments on the preservation of eggs were carried out during 1902, by Mr. Frank T. Shutt, M.A., the Chemist of the Dominion of Canada Experiment Farms. The results are given in the *Report of the Poultry Manager* for 1902. Ten preservative solutions were tried, the most important of which were lime-water, lime-water and common salt, and sodium silicate (water glass). The eggs were immersed in these solutions on February 7, 1902, and were examined on December 1, 1902. They were thus kept for nearly ten months, during a part of which time they were exposed to summer temperature.

As in former years, lime-water was found to be the best preservative, the report on this being as follows:—

> *Saturated Lime-water:* The results with this solution were practically identical with those obtained in former seasons. Appearance, externally and internally, good; 'white,' tinged faintly yellow and somewhat more limpid than in fresh egg; yolk, globular and apparently normal. On poaching, several of the eggs developed a slightly 'stale' odour. Though not equal to fresh eggs in flavour, they were all quite sound and usable.

To prepare saturated lime-water, 1 ℔. of good, freshly burnt quicklime is slacked with a small quantity of water and then stirred into 5 gallons of water. The mixture, after being kept well stirred for a few hours, is allowed to settle. The clear liquid can then be drawn off and can now be poured over the eggs, which have been previously placed in a crock or water-tight barrel.

The following hints are also given in this report:—

> The vessel containing the eggs should be kept covered. The air may be excluded by a covering of sweet oil or with sacking upon which a paste of lime has been spread. If, after a time, there is any notable precipitation of the lime, the lime-water should be drawn or siphoned off and replaced with a further quantity, freshly prepared.
>
> It is essential that attention be paid to the following points:—
>
> (1) That perfectly fresh eggs only be used.
>
> (2) That the eggs should, throughout the whole period of preservation, be completely immersed.

An article in the *Agricultural World* of May 23, states that water glass (sodium silicate) forms the best preservative for eggs, being preferable to lime-water. A letter published in the *Gardeners' Chronicle* of May 23, mentions that the writer has just hatched out a chicken from an egg which had been kept in water glass solution for twelve months.

---

* *Bixa Orellana.*

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 175 of this volume.

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Agricultural News

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NOTES AND COMMENTS.

Cotton Growing in Barbados.

Mr. J. R. Bovell, the Superintendent of the Botanic Station, informs us that samples of cotton grown in Barbados, from Sea Island seed obtained from the United States, have been quite recently valued in London at from 10*d.* to 1*s.* per ℔.

The yield of lint from this variety on two estates, where careful accounts have been kept of the weight of the seed cotton, (on the basis of 1 ℔. of lint to 2 ℔. of seed) is over 500 ℔. per acre.

The Rearing of Ducks.

Our readers will be glad to notice that, in this issue (p. 202), we publish the first of a series of articles on 'Duck Rearing' by Mr. John Barclay, the Secretary of the Jamaica Agricultural Society. As Mr. Barclay points out, ducks will be, for some people, more easy to rear than fowls and will offer, in some cases, a better chance of profit.

Mr. Barclay's articles on 'Poultry' which appeared in Volume I of the *Agricultural News* were much appreciated. That the value of these articles was fully realized in the West Indies, is shown by the keen demand for them in the pamphlet form which was recently issued by the Imperial Department of Agriculture.

This pamphlet (No. 23) is on sale of the agents for the publications of the Department, price 4*d.*

Lime Plants for Distribution.

Mr. W. C. Fishlock, the Agricultural Instructor, informs us that 5,000 young lime plants are available for distribution at the Botanic Station, Tortola, in exchange for other plants.

Applications should be addressed to the Agricultural Instructor, Experiment Station, Tortola, Virgin Islands, *viâ* St. Thomas.

The Sugar-cane Soils of Jamaica.

The *Bulletin of the Department of Agriculture* of Jamaica for May 1903, contains the second and concluding part of a paper by Mr. H. H. Cousins, M.A., F.C.S., the Government Analytical and Agricultural Chemist, on the sugar-cane soils of Jamaica. The first part of this paper appeared in the same journal in April.

The paper gives the results of a most thorough and valuable piece of research, being typical in this respect of all of Mr. Cousins' work in Jamaica. The work consisted in the mechanical and chemical analyses of soil from a large number of Jamaica sugar-cane estates, situated in different parts of the island. The results of the analyses were checked by a series of manurial experiments on the same estates. In his 'Conclusions' Mr. Cousins points out that there are large areas in Jamaica where sugar-cane cultivation would be successful, and says that an increase of irrigable land under sugar-cane is highly desirable. The soils, on the whole, show a high standard of fertility and, unless irrigation and more thorough cultivation generally is adopted, would not repay any outlay in artificial fertilizers.

The Vanilla Industry.

In a recent issue of the *Agricultural News* (Vol. II, p. 188), we mentioned that a small trial shipment of vanilla beans had been sent from the Agricultural School at Dominica to Messrs. Brookes & Green, Brokers, London, to determine their value as an article of export. The following report was furnished by Messrs. Brookes & Green to the Commissioner of Agriculture:—

'We duly received the small package of vanilla beans, and included them in our Public Auction on Wednesday last, and sold same at 7*s.* per ℔. The vanilloes are fairly prepared and we think that further parcels, cured in the same way would sell fairly well, but the outlook of the market is to easier values.'

The *Dominica Guardian* of May 23, calls attention to a notice issued by the Curator of the Botanic Station on this subject. It points out that interest is being taken by the people in the industry, as is shown by the fact that 2,500 vanilla cuttings were distributed last year. It goes on to say that there is still great room for future development of vanilla cultivation and mentions that, at the last Agricultural Exhibition, samples of prepared vanilla were shown which would compete with any that could be obtained in the West Indies.

Insect Notes.

We publish in this issue (p. 200) extracts from a report prepared by Mr. Henry A. Ballou, Entomologist on the staff of the Imperial Department of Agriculture, on observations made during his recent visit to St. Kitt's-Nevis.

Mr. Ballou's notes on the economic insects of these islands, and on the best methods of dealing with them, are of great importance to agriculturists in the West Indies. We propose to publish similar extracts from Mr. Ballou's reports dealing with his visits to Antigua, Dominica, Montserrat and St. Lucia.

Spraying Outfit.

The Imperial Department of Agriculture has recently received from Messrs. Peter Henderson & Co. of New York, spraying apparatus consisting of a 'Success' Knapsack Sprayer and a 'Pomona' outfit with truck. This latter is fitted with four lines of hose, any or all of which can be used at one time, and two bamboo nozzle extensions with double Vermorel nozzles. The other nozzles are of the Seneca type. This is a valuable machine and will be used in experiment work, so that it may serve to assist the planters in ordering spraying apparatus for their own use.

Crop Prospects in Trinidad.

The following note is taken from the *Port-of-Spain Gazette* of June 4:—

'Since last mail the only sugar-cane factories which were grinding have closed their crops; on the whole the year's results are generally considered good. On all the estates farmers seem to have started afresh, filled with hopes of future prosperity by the near approach of the time for the coming into effect of the Brussels Convention on September 1. Of late a number of cane fires have done extensive and serious damage to men of this class. In the local market, yesterday, cacao was selling at prices ranging from \$12·00 to \$12·10 for good red ordinary, up to \$12·30 and \$12·75 for fine estates marks.'

Importation of Sugar-cane from Barbados.

Indian Planting and Gardening of April 11, publishes some correspondence between Mr. C. A. Barber, the Government Botanist, and the Secretary of the Coconada Chamber of Commerce, on the subject of the suggested importation into India of cane seedlings from Barbados.

Mr. Barber points out the danger of introducing new insect and fungoid pests. He states that each country appears to possess its own special diseases of the cane and that there are three serious ones in Barbados at the present time. Mr. Barber recommends that no foreign cane be imported, unless it has been proved to be superior to the native canes, nor until a competent judge has determined whether there is any risk of the introduction of a grave disease without commensurate advantages.

In his reply, the Secretary states that the Chamber is desirous of importing canes from Barbados but says that it will not dispose of seeds or cuttings from the West Indies except under advice and sanction.

The quarantining of plants imported from other countries is most important. It would be impossible to take too great care in avoiding the introduction of new pests.

Experiments in Feeding Cattle.

The *Agricultural World* of May 16, gives the results of some interesting experiments in feeding cattle, which were recently carried out by the Agricultural Department of the University of North Wales, to test the feeding value of buffalo gluten feed, which is an American food stuff prepared from Indian corn. The experiments were continued for ten weeks.

Two lots of four bullocks, which had been similarly treated for the previous six months, were taken and fed alike, except that Lot I received buffalo gluten feed at the rate of 8 ℔. per day, while Lot II received 4 ℔. decorticated cotton cake, and 4 ℔. barley meal.

The cattle in Lot II gained 1 cwt. 37 ℔. more than those in Lot I, this, at 34*s.* per cwt., amounted to £2 5*s.* 3*d.* The extra cost of the feeding of Lot II was 19*s.* 6*d.*, so that the net gain in favour of Lot II was £1 5*s.* 9*d.*, or 6*s.* 5*d.* per head.

This experiment clearly shows that, in England at least, the buffalo gluten feed, though a useful feeding stuff, is inferior to decorticated cotton cake and barley meal.

Similar precise experiments, to test the comparative values of different food stuffs, would probably be of great value in the West Indies.

The Value of Plant Breeding.

We have already drawn attention in the *Agricultural News* (Vol. I, p. 247) to the possibilities of plant breeding. Professor Willet M. Hays in a Bulletin (No. 29), published by the Division of Vegetable Physiology and Pathology (United States Department of Agriculture), entitled *Plant Breeding*, gives some further figures in support of the value of this process.

He states that the Minnesota station, in ten years, by careful breeding, produced a new variety of wheat, yielding nearly 25 per cent. more grain than its parent form, which was the best variety generally grown in the state. He then points out that 25 per cent. increase would add 625,000,000 bushels of wheat to the world's supply. At 80c. per bushel this means an increase in value of \$500,000,000 for each year. Even if the increase be only 5 per cent. or 1 bushel per acre, we should still have an increase of \$100,000,000 per annum. And, since the United States produces about one-fifth of the world's wheat supply, an annual increase of 1 bushel per acre would give, in ten years, an increased valuation of \$200,000,000 for that country. He states, moreover, that one-tenth of 1 per cent. of this sum would, doubtless be more than sufficient to produce a much greater increase than 1 bushel per acre and that 25 per cent. increase in yield is a conservative estimate of what could be ultimately accomplished by careful breeding.

INSECT NOTES.

The following extracts are taken from a report prepared by Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture after a visit to St. Kitt's-Nevis in March last :—

'The canes on several estates were carefully examined and the Moth-borer *(Diatraea saccharalis)*, the Weevil borer *(Sphenophorus sericeus)*, and the work of the Shot hole borer *(Xyleborus perforans)* were all found, though not to any great extent, and Mr. Lunt and others inform me that the damage done by these insects is much less than in previous years. This is probably due, in large part, to the methods employed against them by the planters, following the suggestions of Mr. Maxwell-Lefroy, especially the cutting out of 'dead hearts' in the case of the Moth-borer and the burning of the rotten canes in the case of the Weevil borer.

'Grasshoppers *(Shistocerca pallens)* have been a serious pest in certain years, but during the last year they have not been so numerous as to attract special attention. The most effective remedy tried, so far, is their collection by hand; this is done by children, and a penny per hundred has been paid for the grasshoppers. Large numbers have been collected and destroyed by this method.

'The Mole Cricket *(Scapteriscus didactylus)* has made its appearance at only one place in the island, so far as is at present known. That place is in the kitchen garden at West Farms, where it has caused serious trouble during the past season. This insect lives in burrows underground and comes out generally at night to fly and run about. It burrows along close under the surface of the ground and, frequently, the course of the burrow can be traced by the slight ridge of earth above. These burrows serve as run-ways and all roots that come into them are eaten off. The mole cricket feeds mostly on living plant tissue and a method of killing, suggested by the United States Department of Agriculture, (*Bulletin No. 2* of the Porto Rico Agricultural Experiment Station, 'The Changa or Mole Cricket; see also *Agricultural News*, Vol. II, p. 104) is by the use of poisoned bait, which consists of some plant which the mole cricket will eat, taken fresh, chopped up in pieces of one inch or less, sprinkled with sweetened water, and poisoned with Paris Green or other arsenical poison. This is scattered about in the infested area either on, or just under, the surface of the ground. If there are fowls about, the bait should be covered to prevent their being poisoned.

'Mr. Dobridge has used a very simple and efficient plan, which consists of putting small dishes in the soil with their upper edge just at the surface of the ground. These dishes contain a small amount of water, and the insect, in running about at night, falls in and is unable to get out. If a small amount of kerosene were added to the water they would not only be unable to get out, but the action of the oil would very soon kill them.

'Several caterpillars attack the leaf of the cotton plant, but apparently only one is of much importance, this is probably the Cotton Worm *(Aletia argillacea)*, so common in the United States. There seem to be two methods of fighting this insect: one is hand picking of the caterpillars which may be effectual in cases of attacks on limited areas, the other is the use of poisons, chiefly arsenicals, which would seem to be much the more economical and effective.

'Corn is attacked by a caterpillar that eats down into the crown of the plant, sometimes destroying the flower.

'There are a number of pests reported attacking sweet potatos, but I was able to collect only one. This one is called 'Jacobs' locally. It was described first from Barbados, by Waterhouse, in 1849 as *Cryptorhynchus batatae*. Apparently all stages of its life are passed in or near the tuber of the sweet potato. I found it at Nevis on Ward's Estate, where it was doing much damage, and all stages (except the egg) were found in these potatos. This small weevil-like beetle tunnels the potato through and through, imparting to it a most disagreeable odour which causes all kinds of stock to refuse to eat the affected tubers. On cutting such a potato there will be seen the small white grubs, the pupæ and the dark, greyish-brown beetles. Rotation of crops and the choice of suitable soil seem to be the best remedies now known. Soils rich in organic matter seem to be most favourable for the insect, and soils without humus and with a large proportion of clay seem to be less favourable to its development. The other pests of the sweet potato are a caterpillar, which attacks the leaf, and a stalk borer, neither of which was I able to find. Both are reported to be quite serious, however, at times.

'Ticks on cattle are present throughout the island, but are not considered to be a serious pest. Carbolic soap, Jeyes' Fluid and sea bathing of the cattle are the remedies used.

'The plants in the nursery and garden at the Botanic Station were carefully examined for insect pests. The Black Lime scale *(Ischnaspis filiformis)* is the only serious pest. It infests a number of palms and palm-like plants and is very resistant to the ordinary methods of treatment.'

Solar Rainbow. Mention was made in a recent issue of the *Agricultural News* (Vol. II, p. 172) of a striking halo round the sun at noon, observed at Barbados on May 6. Mr. E. L. Laborde, in a letter to the Commissioner of Agriculture states that the phenomenon was noticeable in St. Lucia on the same day. A similar phenomenon, but more distinctly outlined and perhaps darker in appearance, was seen in St. Lucia on the same date last year and was probably visible also in Barbados. Occurring, as it did, just at the time of the first volcanic disturbance in Martinique, and two days before the destruction of St. Pierre, many people in St. Lucia connected it, in some unexplained way, with the eruptions. We learn that a similar halo was also seen at St. Vincent.

ABNORMAL ORANGES.

Some curious specimens of abnormal oranges have recently been brought to the notice of the Imperial Department of Agriculture. They were obtained by Mr. Robert Ward, the Agricultural Instructor in British Guiana, from a settlement in the Pomeroon river in that colony and were presented by him to Dr. Morris during his recent visit. A rough sketch of one of these oranges is show in Fig. 14.

In each case about one-fourth to one-third of the fruit has the characteristic appearance of a sour orange, while the remaining two-thirds to three-fourths is of the ordinary sweet orange type (see Fig. 14). The sour orange part possesses a thicker skin than the remainder, the pits are more numerous, smaller and closer together, and the odours given off when the skin is scratched are quite distinct. The line of demarcation between the two parts is very definite.

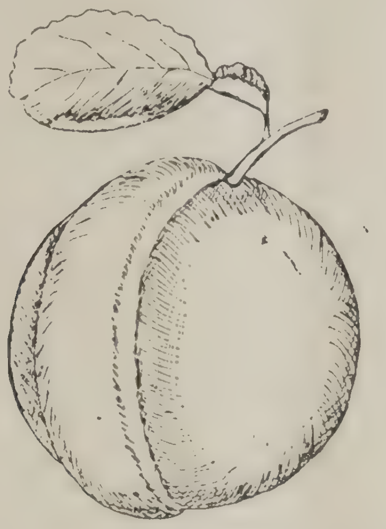

Fig. 14. An Abnormal Orange.

The fruits were borne on a sweet orange tree. An explanation of the abnormality which has been suggested is that some of the pollen, by which the flowers that bore the fruit in question were pollinated, came from a sour orange tree. It is hard to think, however, that this would affect the fruit, the seeds, of course, being the only parts formed from the fertilized egg cell. Another explanation is that this is a case of partial reversion to a more primitive type; cases of this kind are not infrequent among highly cultivated plants. In any case the phenomenon is worthy of record.

AGRICULTURAL SOCIETIES.

Dominica.

Mr. A. K. Agar, the Secretary, informs us that a meeting of the Dominica Agricultural Society was held on May 29. The first business was to elect a committee to supervise the 1904 Agricultural Show. The subject of cotton growing was fully discussed, and those planters present who had estates on the Leeward coast expressed their willingness to make experiments in this cultivation. Mr. Blattau then outlined his scheme for erecting a factory for the manufacture of cassava starch. Several questions were put to Mr. Blattau, but no definite arrangements could be made though the meeting was unanimously in support of the scheme. A list of questions concerning the yield, etc., of cassava in Dominica will be circulated among the planters, replies to which are to be forwarded to Mr. Blattau for his information.

ONIONS FOR THE NEW YORK MARKET.

The following extracts are taken from an interesting letter addressed to the Commissioner of Agriculture for the West Indies by a firm of Agents in New York, closely connected with the onion industry:—

We have received, on different occasions, onions grown at Antigua from similar seed to that used in Bermuda. As they are forwarded in such small quantities, a fair demonstration has not been given as to the relative value of these onions. In addition to the smallness of the quantity coming here from Antigua, the growers there have not been correctly posted as to the method of packing and the kind of package best suited for this market.

As you no doubt are aware, Bermuda onions do not reach this market until after March 20. These are packed in crates containing about 56 ℔. These crates are made of shooks which are imported into Bermuda from Canada and which cost about 4c. to 5c. each. One disadvantage under which Bermuda suffers is the uncertainty of the crop. It has frequently occurred that, while a month or six weeks before reaping time the crop would be estimated to be a large one, by the prevalance of an easterly wind for a week or two, and dry weather, the onions will take disease and the result will turn out only half of the estimated crop. Such was the case this season. The writer was in Bermuda during February and March and, after travelling all over the islands, concluded that the prospects for a large crop were excellent. Before he left Bermuda early in March, however, the crop took the disease. In consequence of this, Bermuda has shipped already 90 per cent. of its crop and only about 200,000 crates have come forward; while, three years ago, 425,000 crates were shipped to this market from Bermuda between March 29 and June 10.

The duty on foreign onions is 40c. per bushel of 60 ℔. and the freight from Bermuda is 16c. per crate. The freight from Barbados will probably be less. The first onions which were shipped from Bermuda this season were purchased here at $3·25 per crate and, as is always the case, the market has declined steadily since the first shipment arrived. The average selling price this season for Bermuda onions has been about $1·60 per crate here. Unfortunately for Bermuda, her shippers have never worked in harmony in controlling shipments from there, consequently large quantities have come here when the market could not take so many and prices have been unnecessarily reduced.

Bermuda cannot ship to this market earlier than March 20, and it seems to us that, if your market can furnish good stock *earlier* than this, you will find a very ready and profitable market here.

Candle Trees and Cativo. In a previous issue of this journal (Vol. II, p. 88), we drew attention to the occurrence of the Central American 'candle tree' *(Parmentiera cerifera)* in Barbados. Mr. J. H. Hart, F.L.S., Superintendent of the Botanical Department, writes saying that in the Botanic Gardens, Trinidad, the candle trees are perfectly healthy and that they fruit regularly year by year. Mr. Hart also says that he has seeds of *Prioria copaifera*, the tree from which cativo is obtained *(Agricultural News*, Vol. II, p. 85), for distribution if required. Mr. W. Fawcett, B.Sc., F.L.S., the Director of Public Gardens and Plantations, Jamaica, also writes drawing our attention to an article in the Jamaica *Bulletin* (Vol. IV, p. 77) in which an account of the discovery of *Prioria copaifera* is given. The specimen from which the tree was named was found growing near Bath in Jamaica.

REARING OF DUCKS.

The following notes have been contributed by Mr. John Barclay, the Secretary of the Jamaica Agricultural Society:—

In my previous notes on 'Poultry Rearing,' I dealt only with fowls. These are far more commonly kept than ducks and are more generally useful. But in many parts of the West Indies, fowls do not thrive with as little trouble expended on them as ducks would. This is particularly the case in very wet districts. In such parts it is often difficult to raise chickens, and to keep hens clear of roup. Now ducks are proof against colds, which are the result of damp and chills. We have many such wet districts in the West Indies where people struggle along with their fowls under difficulties which would not be experienced with ducks. Not that they would not have troubles, but these would only be such as are met with, incidentally, in rearing any live stock. I do not mean at all that people who live in dry parts, or districts which are not very wet, should not keep ducks. There is no reason why they should not, even if there is not enough water to provide a swimming pond. In fact, ducks are often more easily and more cheaply raised than fowls, where there is no water for them to swim in, but where they have a range and plenty of water to drink. They are, moreover, preferable where there are gardens kept, or when seeds are being planted.

Hitherto it has been considered that ducks are not so prolific as fowls, and, therefore, that there is not so much to be made out of them, because they do not lay so many eggs. This, however, does not now hold good, because, just as there are modern breeds and modern strains of fowls in which almost phenomenal laying powers have been developed, so the fecundity of ducks has been greatly increased, and improved breeds introduced, both for table and for laying purposes. I am sure it will be new to most people in the West Indies to learn that, just as there are hens like Leghorns and Minorcas, which are non-sitters, and lay perhaps 180 to 200 and more eggs in the course of a year with good treatment, so there are breeds of ducks which are practically non-sitters, and lay quite as many eggs as the most prolific hens.

BREEDS OF DUCKS.

The most common breed in the West Indies, and what may be looked upon as the native duck, is the Muscovy. This grows to as large a size as any other breed such as the Pekin or Aylesbury, for instance, and is very hardy. It is usually pure black, or pure white, or black and white in colour, the black having a green sheen as in the Langshan fowl. The Muscovy is not, however, a very good layer, though this may be owing to the fact that the breed has never been taken in hand, as have other breeds more popular in the North, and improved by careful breeding and feeding. In fact it is a breed little used in the North. With this breed, it must have been a case of survival of the fittest before it reached its present degree of hardiness, for it thrives and multiplies in the gutters and back yards of tropical cities, and I have seen Muscovy ducks paddling along the gutters of lanes in Kingston, Jamaica, with trains of active youngsters, right among the feet of passers by. This capacity, to live under the roughest conditions, breeding anywhere and anyhow, is obtained at the expense of quickness of growth, fecundity in egg laying, and tenderness of flesh. In these points the Muscovy cannot compare with the well known, improved, modern breeds to be described later.

There is an opportunity, however, for an enterprising breeder to improve this breed, by careful mating and feeding, building upon its hardiness and activity, which should be retained. By this means a fine breed might, ultimately, be produced most suitable for the ordinary rough and ready conditions and methods, of the ordinary planter in the West Indies, who may wish to have ducks about his place to pick up odd trifles and be ready to be fattened for table when wanted, but who does not mean to spare much time and trouble over his ducks. Such a man is almost always willing to buy a fresh drake from a known breeder at a fair price, so that he may have fresh blood to keep up the size and stamina of his flock. The Muscovy is a different species from other ducks and it must be particularly noted that its eggs take five weeks to hatch instead of four weeks, and that the cross with the ordinary ducks, Pekin, Aylesbury, Rouen, etc., results in mules, that is, the ducks of such crosses will lay, and are usually fine layers, but the eggs will not hatch. The Muscovy duck does not lay many eggs, just as many as she can cover, twelve to twenty. She makes a good mother, being attentive and careful, though vicious in other respects. The Muscovy drake is often very cruel to other birds kept in the same yard.

(To be continued).

EDUCATIONAL.

Lectures to Teachers.

LEEWARD ISLANDS.

We published in the *Agricultural News* (Vol. II, p. 90) a scheme of lectures to teachers forwarded by the Commissioner of Agriculture to his Excellency the Governor of the Leeward Islands.

The Colonial Secretary has, by the direction of his Excellency, recently forwarded to the Commissioner of Agriculture a copy of a report on these lectures by Mr. C. M. Martin, B.A., the Inspector of Schools, from which we make the following extract:—

Lectures are being given in St. Kitt's, Antigua and Montserrat. The courses for the Virgin Islands and Dominica have been unavoidably postponed. I was present at one lecture given by Mr. Kirby, in Antigua, or rather at one of the exercises comprised in the course, that is, model lessons given by selected teachers and criticized by Mr. Kirby. I can conceive of nothing more valuable to the teachers in Antigua than the methods pursued by Mr. Kirby, and the teachers have expressed to me their appreciation of his teaching. Mr. Jordan is giving a series of practical demonstrations to the teachers in Montserrat. I hope to be present at some of these on my return to that Presidency, and I have every reason to think that the instruction is practically beneficial.

ST. KITT'S.

Mr. John Belling, B.Sc., the Agricultural and Science Master at the Grammar School, St. Kitt's, delivered the third of a series of lectures to teachers on May 30. The first lecture was given on March 21 (*Agricultural News*, Vol. II, p. 138).

The subject of the lecture was 'The Roots of Plants.' Roots of sunflower and Indian corn, beet, and of cuttings were examined and their characteristics and differences pointed out. A number of experiments with roots were also performed, proving the need of water and of food salts from the soil, etc.

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

In view of the strenuous efforts made by the officers of the Imperial Department, during the last five years, to carry out the onerous duties entrusted to them, it is only right that all grades of officers connected with it should have an opportunity of reading an expression of opinion, by a representative body of proprietors and merchants in London, in regard to the results of some of their labours.

The following extract is taken from an address, presented at the General Annual Meeting of the West India Committee, held in London on May 14 last, by the Chairman, Sir Nevile Lubbock, K.C.M.G.:—

> Now I must say a word about the Imperial Department of Agriculture. I think we all agree that Dr. Morris and those under him are doing most excellent work in the West Indies as regards seedling canes. Though perhaps we have not quite arrived at what we expected, when these seedling experiments were first undertaken, we have undoubtedly arrived at something which is of very considerable advantage to us. It seems to be beyond doubt, now, that we can grow very fine crops of seedling canes. That is the result of our experience, and I think it is also clear that there is more vitality about seedling canes than about the Bourbon, and that where the seasons are not very favourable, the seedling canes will stand them better than the Bourbon cane. Those are two very great advantages attaching to seedlings, which were not anticipated at the time the seedling experiments were started. We may therefore be well satisfied that we have gained considerably in those two ways. The Imperial Department of Agriculture has not, however, been satisfied with merely making experiments with seedling canes. They have been dealing with a large number of other matters. I notice from the latest publications, that they are now making experiments in the growth of cotton; that they are almost beyond the experimental stage in regard to the growth of onions, which is becoming an appreciable crop in some of the islands; that honey has received their attention; and, as you all know, cattle diseases, the diseases of poultry, the diseases of cacao, the diseases of sugar-cane and the diseases of all crops have been receiving most careful attention. It is quite clear that the Department is doing most excellent work in the West Indies, and I think, as I have said once before, that perhaps the work that will be of most use and importance to the West Indies is the work of education which is practically being carried on by them. I do not mean, alone, the education that they are providing at the schools, but the education of the people by calling their attention to all these different crops and their diseases, and the proper manner of dealing with them. I feel sure, that it would be quite your wish that we should heartily thank Dr. Morris and those under him for what they are doing in the West Indies.

Manjak from Trinidad. According to the Trinidad *Mirror* of June 4, the Government Railway Department is making special arrangements to facilitate the rapid and economical transport of manjak from the mines at Vistabella and Marbella. The same paper also states that the manjak is of exceptionally fine quality and, in appearance at least, is, if anything, superior to the best obtained in Barbados.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture for the West Indies returned from British Guiana on June 6 last. During his stay in the colony he visited the Botanic Gardens and Sugar-cane Experiments with Professor Harrison and the officers in charge. On Friday, May 29, in company with Mr. J. B. Laing he inspected the new crushing machinery and cane-feeder at Plantation Diamond. The field cultivation at Diamond consisted of about 2,000 acres in seedling canes. Accompanied by Mr. E. C. Hamley (chairman) and Messrs. E. Russell Gurney and I. Gillespie, directors of the British Guiana Bank, a visit was paid on Saturday, May 30, to Plantation Vergenoegen to witness experiments in mechanical tillage. On Monday, June 1, Dr. Morris visited the county of Berbice with Mr. F. I. Scard, and had an opportunity of observing experiments with seedling canes at Plantation Albion, covering about 1,500 acres. On Wednesday, June 3, Dr. Morris attended, as honorary member, a meeting of the Board of Agriculture; and, later in the afternoon, delivered an address on cotton cultivation and kindred subjects before the Royal Agricultural and Commercial Society.

Mr. W. G. Freeman, B.Sc., F.L.S., Scientific Assistant on the staff of the Imperial Department of Agriculture for the West Indies, has been appointed Superintendent of the Economic Collections at the Imperial Institute under the Committee of Privy Council for Trade (Board of Trade). Mr. Freeman is to be congratulated on his selection for this post. Mr. Freeman's services in connection with the Imperial Department of Agriculture were greatly appreciated, and his future career will be watched with great interest by his colleagues and friends in the West Indies.

On the recommendation of the Director of the Royal Gardens, Kew, Mr. Archibald Brooks has been selected for the appointment of officer-in-charge of the Agricultural School at Dominica, in succession to Mr. David Tannock.

On June 9, the Imperial Commissioner of Agriculture for the West Indies arrived at St. Vincent in R.M.S. *Eden*. He was accompanied by Mr. George Whitfield Smith, F.L.S., Travelling Superintendent; Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department, and Mr. A. B. Price, Assistant.

During Dr. Morris' visit, he spent some time in inspecting the Botanic Station and Agricultural School, and at mid-day on Wednesday, he attended a conference of representatives of the principal landowners in the island in reference to proposals for starting a cotton industry. Dr. Morris and the members of his staff left St. Vincent in the Canadian Mail Steamer *Dahomé* on Saturday the 13th. instant, and arrived at Barbados on June 14.

GLEANINGS.

The *Hawaiian Planters' Monthly* for April 1903, estimates that the total production of sugar in Hawaii will be about 390,000 tons.

It is stated in the *Crop Reporter* for January 1903, that the final report of the Statistician of the United States Department of Agriculture shows the actual growth of cotton in the United States in 1901-2 to have been 9,966,478 commercial bales.

The Director of Public Gardens and Plantations in Jamaica states that the African creeper *Camoensia*, with large white flowers edged with gold, is now in flower at Hope Gardens on the calabash tree on the lawn. The beautiful orchid *Cattleya Dowiana aurea* is also in flower. (Jamaica *Daily Telegraph*, May 30, 1903.)

According to *Our Western Empire* for May 15, 1903, 'molascuit appears to be booming. In 1902, 1,938 cwt. were shipped to Liverpool; this year the figure is already 5,238 cwt., and the import into the United Kingdom for the whole year is estimated to reach 37,000 cwt. The above figures, it may be stated, are from British Guiana alone.'

The earth nut or pea nut *(Arachis hypogæa)* has come to be considered one of the best foods for poultry, whether laying hens or growing chickens, excelling maize, wheat or oats. It does not over-fatten and keeps the birds in good health. They are thrown with tops and all and keep hens busy all day. *(The Agricultural Journal of Natal,* April 17, 1903).

Mr. Lunt, the Curator of the Botanic Station at St. Kitt's, reports that the Hereford bull, introduced by the Imperial Department of Agriculture into Nevis (see *Agricultural News*, Vol. II, p. 89), is in fine condition and is thriving on his present food which consists of cane tops, grass and molasses. Mr. Lunt adds that he is informed that the half-bred donkey stallion is quite a success.

The *Gardeners' Chronicle* of May 16, gives an illustration of a plant of *Coffea robusta* growing in the Botanic Garden at Entebbe in Uganda. The plant was received in 1901 as a seedling from Kew and is now 5 feet high. It is hoped that the robust habit of the plant will give it immunity from fungoid and other pests which have so seriously interfered with coffee cultivation in Ceylon and other countries. *Coffea robusta* has been under cultivation at the Botanic Stations in Trinidad and Dominica *(Agricultural News,* Vol. I, pp. 121, 278), but did not prove an entire success at low elevations in the latter island.

At a meeting of the Board of Education at Trinidad on May 26 last, it was decided that the School Agricultural Shows should be held at Trinidad and Tobago in November and December next.

The number of packages of honey shipped by the Beekepers' Association on May 28 to London, states the Jamaica *Daily Telegraph* of May 30, was 282. It is expected that the next shipment will be twice as large.

It is stated in the *Board of Trade Journal* for April 23, that over 1,400,000 tons of raw beet sugar were produced in Germany during the eight months ending March 31 last. Over, 1,900,000 tons were produced during the corresponding period of the previous sugar campaign.

The West India Committee wrote to the Treasury on the 29th. ultimo urging the remission of the duty upon cattle food made with molasses, and the Chancellor of the Exchequer has stated in the House of Commons that he proposes to take the duty off molasses containing 50 per cent. sweetening matter.

The *Agricultural World* of May 23, mentions that an American syndicate is negotiating for the purchase of 74,000 acres of land on the north side of the island of Jamaica, for the cultivation of bananas and cacao, and is arranging a contract with a steamship line to New York to take the products to the United States. The scheme includes the construction of a light railway through the plantations, to facilitate the rapid handling of the fruit. The syndicate will oppose the United Fruit Company in the American market.

The following resolution was carried unanimously at a recent meeting of the Oldham (Lancashire) Association of Chambers of Commerce:—

'This Association views with satisfaction the efforts being made to develop the resources of our colonies and dependencies, and strongly supports the action of the British Cotton Growing Association in seeking new cotton fields within the Empire.'

Drawing attention to the diminution of forest lands in the world, *Export Trade* for April 1903, states that Sweden, Norway, Russia and Austria are the only European countries from which wood is exported, the largest supply coming from America. In Sweden, regulations have already been issued by which the trees in some provinces may only be felled when they have reached a certain size. We have often, in the *Agricultural News*, drawn attention to the need of conserving forest lands in the West Indies.

Readers of the *Agricultural News* are informed that portfolios, half-bound, leather, marble sides, gilt-lettered at back, to hold a year's issue may be obtained at 2*s.* each. Also that Vol. I can be bound with title page and index, full cloth, at 2*s.* 6*d.* each; or half-bound, leather, marble sides at 3*s.* each. This is for binding only. All correspondence, in reference to the supply of portfolios and for binding the *Agricultural News*, should be addressed to the *Advocate* Printing Works, Prince William Henry Street, Bridgetown, Barbados.

BRITISH GUIANA.

Visit of the Commissioner of Agriculture.

The following extracts are taken from the Demerara *Daily Chronicle* for June 4 last:—

A meeting of the Board of Agriculture was held in the Court of Policy Hall yesterday. The deputy chairman (Professor J. B. Harrison) presided, and there were in attendance Dr. Morris, C.M.G., Imperial Commissioner of Agriculture, Dr. Evans (Curator of the Museum), Colonel Lushington, Mr. F. I. Scard, Mr. J. Monkhouse, Mr. B. Gainford, Mr. B. H. Jones, Mr. J. A. Raleigh (Government Veterinary Surgeon), and the Rev. F. C. Glasgow, with Mr. O. Weber (secretary).

WELCOME TO DR. MORRIS.

Professor Harrison, welcoming Dr. Morris to his seat as an honorary member of the Board, said: 'The first business of the day is that for which we have been waiting ever since the inception of this Board. We have been anxious all along for this opportunity, we now have, of welcoming Dr. Morris to his seat as an honorary member. We all recognize very fully the very excellent work which he has done, not only in recent years in the West Indies as Commissioner of Agriculture, but in those many years when he was in Jamaica as Director of Agriculture. Many of us will remember how ready he was to give both assistance and advice to any of us who applied for it. Then again, we have that further period during which he was Assistant Director at Kew, which period we may safely consider as being that in which the agricultural welfare of the West Indies loomed large practically for the first time, and during which the active interest which is now being taken in West Indian agriculture was first awakened. On behalf of the Board, Dr. Morris, I welcome you to your seat as an honorary member.'

Mr. Jones endorsed Professor Harrison's remarks. 'We who have not been so intimately acquainted with Dr. Morris can hardly speak of the work he has done in previous years,' he said, 'but during the time that he has been head of the Imperial Department of Agriculture, I am sure we have all received a great deal of instruction from reading the various papers and reports he has issued. We hope that in future he will visit us more often, and that we shall always be able to receive that advice and assistance he has so readily given, hitherto, in the same kindly way that it has been accorded us in the past.'

REPLY BY DR. MORRIS.

Dr. Morris, in thanking the Board for his reception, expressed the pleasure with which he visited British Guiana at the present time. Dr. Morris proceeded: 'As no doubt you are aware, I have travelled in the colony and have visited several of the principal estates, Diamond, Vergenoegen, Albion in Berbice, and others. I have also visited, with Professor Harrison, the experiments carried on under the direction of the Board at the Botanic Gardens and elsewhere, and I desire to express my admiration at the very great progress that has taken place in these, and similar matters, since I was here six years ago. On every side, a new feeling has arisen and a new energy seems to have taken hold of the planters and of the leading officials in connexion with agricultural work. It is most gratifying to find how thoroughly in earnest those with whom I have come in contact during my visit are, in connexion with agricultural matters. They have set to work in a remarkably earnest and practical manner to carry out the duties entrusted to them. There are many subjects on which I would like to speak this afternoon, but it is impossible for me to do more than express to you, gentlemen, my gratification at being present here to-day, and the pleasure with which I have followed the great work in which you are engaged. The agenda of the Board is sent to me regularly and I am kept fully informed as to its proceedings. I am of opinion that the Board, as now constituted, is doing excellent work. It is in touch with all classes of the community, and it evidently sympathizes with small cultivators as well as with large cultivators. As regards the sugar-cane experiments carried on here in which, as you are aware, the Imperial Department takes great interest, and to which it contributes a share of the expenses, I am in a position to state that the character and extent of the operations are such that I believe they are not surpassed by similar experiments in any part of the world. I heartily wish the Board every success in its efforts; and I am satisfied that if I have the pleasure of visiting British Guiana, later on, I shall meet with still greater evidence of the good work carried on by it. I thank you, gentlemen, for your kind reception of me to-day, and I need only add that I shall be glad to be of service to you.'

ST. VINCENT.

The following extract is taken from the St. Vincent *Sentry* of June 12 last, in reference to the efforts being made by the Department to assist in the establishment of a cotton industry in that colony:—

On Tuesday last the Imperial Commissioner of Agriculture for the West Indies arrived in the R.M.S. *Eden.* He was accompanied by Mr. George Whitfield Smith, F.L.S., Travelling Superintendent; Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Department; and Mr. A. B. Price, Assistant.

The principal object of the visit was to arrange the details of a scheme, approved by the Secretary of State, for starting a cotton industry in the island. Dr. Morris attended a conference of representatives of the principal landowners here at mid-day on Wednesday last, and explained the proposals of the Department in reference thereto. The great utility of the Department of Agriculture for the West Indies lies in its untiring efforts not only to aid the resuscitation of the depressed staple products of these colonies, but the establishment and promotion of minor industries in order to hasten the return of prosperity to this fruitful . . . . . . portion of His Majesty's Dominions beyond the seas. Formerly the . . . . smaller islands were neglected whilst the more important places, as Jamaica, British Guiana, and Trinidad, monopolized the little attention that could be spared to the West Indies. But, with the advent of Dr. Morris, the old order has changed, and the advantages offered by the Imperial Department for the development of the agricultural resources of these islands are being enjoyed, even now, by the smallest as well as the greatest. The opportunities of starting new industries are placed at our doors by the Department and, in addition to those facilities, markets are being found and opened for our products. It is, therefore, for landowners to utilize these advantages to their own benefit. If, through apathy or indifference, they directly or indirectly scorn the proffered aid and advice, in matters that are calculated to advance their own interests and promote the prosperity of the colony, they will have themselves to blame if the wave of industrial expansion that is now moving towards the West Indies does not beat propitiously on the shores of St. Vincent. During recent months we have read sufficiently of the prospects of the cotton and fruit industries, and we have also read enough of the arrowroot market, to convince us that it is necessary to restrict the cultivation of the latter product and apply ourselves to the development of the former. Whilst cacao is at present enticing, it would be injudicious to devote our lands exclusively to that product, as a similar rush to sugar, when cane was king, has proved. There is the possibility of the cacao market being glutted in the near future, therefore let us show that we have learnt wisdom from experience, take the advice of Dr. Morris and readily accept the opportunities that are arising in favour of the colony.

Cotton Planting in St. Vincent.

An important meeting of the representatives of the principal landowners in St. Vincent was held, at the invitation of his Honour the Administrator, at the Government Office on June 10, to meet the Imperial Commissioner of Agriculture in order to discuss proposals for starting the cultivation of cotton. There was a good attendance and the proceedings were of an interesting and useful character.

After a brief introduction by the Administrator, Dr. Morris gave a sketch of the present position in regard to cotton, and stated that, owing to the fact that the United States were retaining a large proportion of the cotton grown by them for home manufacture, the supplies available for export to European countries, and especially Great Britain, were falling off. In consequence, the manufacturers in Lancashire and elsewhere were becoming anxious as to the future and keenly desirous of opening up new sources of supply. The price of cotton had now risen to such figures that the industry offered more favourable conditions than in any period during the last forty years.

Dr. Morris, continuing, pointed out that cotton required almost exactly the same kind of preparation of the land as sugar or arrowroot, that no expensive buildings and machinery were required and that a factory capable of dealing with the crop of a large district could be built for a few hundred pounds. He added that, in the case of cotton, the crop could be gathered and returns would come in within eight months from the time of planting. Also that the crop, if Upland cotton, might be ratooned for the second and possibly the third time.

The two kinds of cotton recommended were Sea Island and Upland cotton. The former yielded the best quality; but the latter was also worthy of trial as it usually produced the largest crop.

At St. Vincent, it was recommended to plant in successive periods, say, at the end of June, middle of July and middle of August. The crop would then ripen in the drier months at the beginning of the following year, viz: from January to March. The most favourable distances for planting would be 4 feet in the rows and 18 or 24 inches between the plants in the rows.

Picking cotton was a light occupation, exactly suited to women and children. The cost of picking in the West Indies was a good deal less than in the United States. As regards the yield and net returns, experiments carried on for three years by the Imperial Department of Agriculture had proved that, where the local conditions were favourable, the returns from cotton growing were distinctly satisfactory. In fact there was hardly any other crop capable of being cultivated in some of the smaller islands that could be recommended in preference to cotton at present prices, or at such prices as were likely to rule for the next few years.

In conclusion, Dr. Morris stated that, after consultation with the Governor-in-Chief and the Administrator, the Secretary of State for the Colonies, in view of the exceptional circumstances of this much tried island, had approved that the Imperial Department of Agriculture might assist the leading landowners and others in the island in carrying on experiments in the cultivation of cotton on the following lines:—

1. That the Department would import and distribute seed of Sea Island and Upland cotton, free of cost, to those who were prepared to cultivate cotton, on a moderately large scale, during the present planting season.

2. That the Department would afford information, and advise as to the selection of land and the methods of cultivation and also in the event of crops being attacked by insect and fungoid pests.

3. That the Department would provide ginning machines for cleaning the cotton and baling presses for preparing it for shipment; and further, if so desired, it would arrange with the British Cotton Growing Association for disposing of both the cotton and the seed under such circumstances that the maximum returns could be obtained by the planters.

At the close of Dr. Morris' remarks, an interesting discussion took place in which several leading landowners took part. The speakers expressed their readiness to try cotton planting on a moderately large scale and accepted the offer of assistance made through the Imperial Department of Agriculture as detailed above.

It was incidentally mentioned during the proceedings that an interesting plot, containing different varieties of cotton now in flower, was to be seen at the Agricultural School, and that the pamphlets and information respecting cotton-growing in the West Indies, including copies of the *Agricultural News*, could be obtained regularly from Mr. William C. Proudfoot, the local agent of the Imperial Department of Agriculture, in Kingstown. (St. Vincent *Times*, June 11).

NITROGENOUS MANURES.

The following account of purely nitrogenous manures is taken from an article on 'The Purchase of Artificial Manures' that appeared in the *Journal of the Board of Agriculture* for March 1902:—

The most important of these are nitrate of soda and sulphate of ammonia, others in general use being rape dust, blood, meal, shoddy, etc. It is often difficult to say for which of these two manures the conditions are most suitable, and then the question should be decided either by the relative cost of the substances, or by using a certain amount of both.

If one of the organic manures can be bought at a cheap rate it may be used to some extent as an ingredient of a mixture.

Nitrate of soda and sulphate of ammonia are apt to be lumpy, therefore the buyer should look carefully to the mechanical condition. Nothing should be applied that will not pass a $\frac{1}{2}$ inch riddle. Lumps larger than this will often kill plants with which they may come into contact.

Nitrate of soda is generally offered on the basis of 95 per cent. of purity (equal to 15·6 per cent. nitrogen or 19 per cent. ammonia), while commercial sulphate of ammonia usually contains 97 per cent. of the pure article (equal to 20·6 per cent. nitrogen or 25 per cent. ammonia). Sulphate of ammonia is thus much the more highly concentrated manure.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—May 26, 1903.—Messrs. Kearton Piper & Co., Messrs. J. Hales Caird & Co., 'The Gardeners' Chronicle,' May 23, 1903, The Public Ledger,' May 23, 1903.

Aloes—Curaçoa, 14/6 to 30/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, $1\frac{7}{8}$*d.* to $4\frac{1}{2}$*d.* per ℔.
Bees-wax—Jamaica, £7 10*s.* to £8 10*s.* per cwt.
Cacao—T'dad, 58/- to 69/- per cwt.; Jamaica, 51/- to 58/6 per cwt.; Grenada, 53/6 to 60/- per cwt.; Dominica, 52/- to 58/- per cwt.
Cardamoms—Mysore, 1/4 to 3/4 per ℔.
Coffee—Jamaica, 34/- to 56/- per cwt.
Cotton—West Indian, $6\frac{1}{16}$*d.* to $6\frac{3}{8}$*d.* per ℔.
Fruit—
Bananas—5/3 to 8/- per bunch.
Oranges—No quotations.
Pines—Jamaicas, 3*d.* to 1*s.* 3*d.* each; Antiguas, 9/- to 16/- per barrel.
Fustic—£3 to £5 per ton.
Ginger—39/- to 68/- per cwt.
Honey—Jamaica, 16/- to 24/- per cwt.
Isinglass—West Indian, 1/4 to 2/8 per ℔.
Kola Nuts—1*d.* to 4*d.* per lb.
Lime Juice—Raw, 1*s.* to 1*s.* 4*d.* per gallon. Concentrated, £15 to £16 per pipe.
Logwood—£4 10*s.* to £4 15*s.* per ton. (Prices unchanged).
Mace—1/9 to 2/5 per ℔.
Nitrate of Soda—Agricultural, £9 7*s.* 6*d.* per ton.
Nutmegs—70's to 75's, 1/6 to 1/9; 80's to 90's, 1/2 to 1/4 per ℔.
Pimento—$2\frac{1}{2}$*d.* to $2\frac{3}{4}$*d.* per ℔.
Rum—Demerara, $8\frac{1}{2}$*d.* to 10*d.* per proof gallon. Jamaica, 1/6 to 8/- per proof gallon.
Sugar—Muscovado, 11/3 to 12/6; Crystallized, 14/9 to 16/- per cwt.
Sulphate of Ammonia—£12 15*s.* to £12 17*s.* 6*d.* per ton.
Tamarinds—Barbados, 12/- per cwt.; Antigua, 9/- per cwt.

New York,—May 29, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, $1·25 to $1·30; eight hands, 90c. to 95c.; and seven hands, 65c. to 70c. per bunch.
Cacao—African, 12c. to $12\frac{1}{2}$c.; Caracas, 13c. to $13\frac{3}{4}$c.; Jamaica, $10\frac{3}{4}$c. to $11\frac{3}{4}$c.; Grenada, 12c. to $12\frac{1}{4}$c.; Trinidad, $12\frac{1}{4}$c. to $13\frac{1}{4}$c. per ℔.
Cocoa-nuts—Trinidads, $18·00 to $20·00; Jamaicas, $20·00 to $21·50 per M.
Coffee—Jamaica, ordinary to good ordinary, $5\frac{1}{2}$c. to $6\frac{1}{4}$c. per ℔.; Manchester grades, 8c. to $10\frac{1}{2}$c. per ℔.
Ginger—Jamaica, $7\frac{1}{2}$c. to $8\frac{1}{4}$c. per ℔.
Pimento—5c. per ℔.
Rubber—Nicaragua scrap, $68\frac{1}{2}$c. to 69c. per ℔.; Guayaquil strip, 62c. to 63c.
Sugar—Muscovado, 89°, $3\frac{1}{8}$c. per ℔.; Centrifugals, 96°, $3\frac{5}{8}$c.; Molasses, 89°, $2\frac{5}{16}$c. per ℔.

INTER-COLONIAL MARKETS.

Antigua,—June 3, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—20c. to 21c. per gallon, package included.
Sugar—$1·40 per 100 ℔.

Barbados,—June 6, 1903.—Messrs. T. S. Garraway & Co. and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4·00 per 100 ℔.
Cacao—$12·00 to $12·50 per 100 ℔.
Coffee—Jamaica and ordinary Rio, $8·00 to $8·50 per 100 ℔.
Hay—New Brunswick, 85c. per 100 ℔.
Manures—Nitrate of Soda $60·00; Ohlendorff's Dissolved Guano $60·00; Sulphate of Ammonia $80·00; Sulphate of Potash $67·00 per ton.
Molasses—18c. per gallon, and $4·00 for puncheon.
Onions—Madeira, $4·00 per 100 ℔.
Potatos, English—$2·49 to $4·00 per 100 ℔.
Rice—Ballam, $4·60 per bag (190 ℔.); Patna, $3·50 per 100 ℔.; Rangoon, $2·75 per 100 ℔.
Sugar—In hogsheads. $1·25 per 100 ℔., and $5·00 for hhd. In bags, $1·50 per 100 ℔.

British Guiana,—June 4, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8·50 to $9·00 per barrel.
Cacao—Native, 11c. to 12c. per ℔.
Cassava Starch—$7·00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 11c. to $11\frac{1}{2}$c. per ℔. (retail).
—Creole, 11c. to 12c. per ℔.
Dhal—$3·45 to $3·50 per bag of 168 ℔.
Eddoes—$1·00 to $1·32 per barrel.
Molasses—Vacuum Pan, yellow, 16c. per gallon, casks included.
Onions—$2\frac{1}{2}$c. to 4c. per ℔.
Pea Nuts—Curaçoa, $3\frac{3}{4}$c.; American, 5c. per ℔. (retail).
Pigs—Young Boars and Sows, $5·00 each.
Plantains—16c. to 36c. per bunch.
Potatos, English—$2·75 to $3·00 per barrel.
Rice—Ballam, $4·70 to $4·75 ex store; Patna and Seeta, $5·60 to $5·75 per bag.
Creole Rice, 20c. per gallon (retail).
Sweet Potatos—Barbados, $1·90 per barrel.
Tannias—$1·44 per bag.
Yams—$1·80 per bag.
Sugar—Dark Crystals, $1·80 to $1·90; Yellow, $2·25 to $2·40; Molasses, $1·80 to $1·90 per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—Messrs. Gordon Grant & Co., June 4, 1903.

Balata—Very little doing.
Cacao—Ordinary, $12·00 to $12·25; Estates, $12·75 to $13·00 per fanega.
Coffee—6c. to $6\frac{1}{4}$c. per ℔.
Onions—$1·25 to $1·30 per 100 ℔.
Potatos, English—$1·65 to $1·75 per 100 ℔.
Rice—Yellow, $4·25 to $4·40; White Table, $5·25 to $6·00 per bag.
Sugar—White Crystals $3·40; Yellow Crystals for local consumption, $2·25 per 100 ℔.
—Molasses sugar, $1·80 to $2·00 per 100 ℔.

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[33.]

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Solids not Sugar	·184	·163
Quotient of Purity... ...	90·01	91·13
Glucose ratio	2·29	1·99

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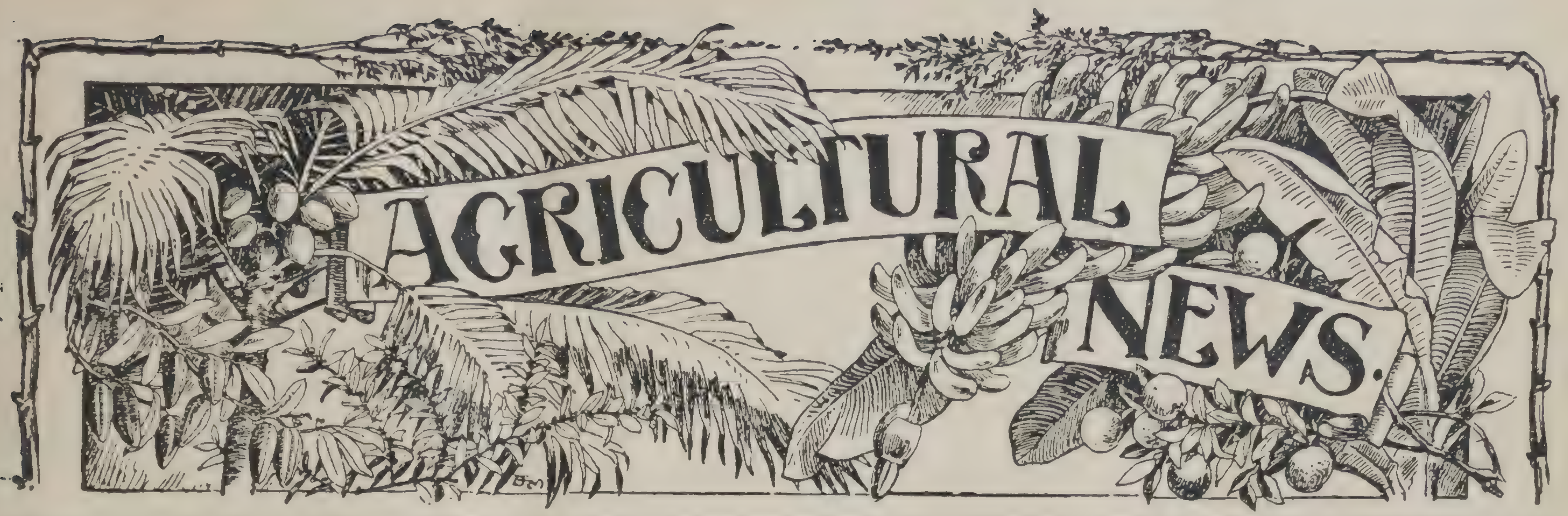

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A FORTNIGHTLY REVIEW

OF THE

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Fruit.

AT the present time, fruit seems to be sharing with cotton the attention and interest of agriculturists in the West Indies. To take recent examples, at the last meeting of the Trinidad Agricultural Society (p. 221) letters were read from Mr. W. Weldon Symington and from Mr. J. H. Hart, the one explaining his fruit scheme, and the other stating that he had cotton seed for distribution; again the recent visit of the Commissioner of Agriculture to St. Vincent, which was undertaken with a view to starting a cotton industry in that island, suggests to the St. Vincent *Times* of June 18, 'to appeal to the Commissioner to extend to the peasants the same assistance and encouragement in the cultivation of fruit, as it is offered for experiments in the cultivation of cotton.'

The two industries show, however, very distinct differences which lead to interesting comparisons. The cotton industry, so far as the present generation of agriculturists is concerned, is new to the West Indies; we do not yet know, exactly, the right way to plant or the right time for planting, while cotton seed of improved varieties has to be imported from the United States and Egypt. The fact, that so little is known of cotton growing, will, probably, lead agriculturists in the West Indies to pay more attention to experimental work and to accept, more readily, the results of the experiments; this is a distinct advantage.

Fruit growing, on the other hand, is an old and well established industry in the West Indies and, consequently, suffers from the disadvantage and enjoys the advantages of traditional methods of cultivation, etc. Now that the Symington Fruit Scheme has given a new impetus to the cultivation, it would be advisable carefully to consider the factors that have been operative in keeping down the fruit industry in the past.

In the first place, enough attention has not been paid to the varieties cultivated. So long as a fruit was an orange or pine-apple or mango it was considered good enough to be exported. At the same time, our rivals in California, Florida, the Canary Islands, etc., not to speak of the fruit growers of temperate climates, have been carefully selecting new and improved varieties and exporting their improved fruits in competition with ours. The consequence has been that, when the two have been placed on the market, the West Indian fruit has had to take the lowest place and sell for what it would fetch. The sooner fruit growers realize that it will pay them to cultivate good varieties alone and destroy all inferior trees, the better for them.

Careful attention to cultural methods is another point in which our rivals are far ahead of us. Too often in the West Indies after a tree has been planted, it is left to take care of itself; the natural results of this 'cultivation' are smaller crops and inferior fruit. This is not the method of up-to-date cultivators of any crop, in any part of the world, and it is not the method by which the largest profits are to be obtained. Careful treatment of the soil, careful pruning of trees, treatment of wounds, prompt and thorough attention to insect and fungoid diseases, all cost a certain amount of time and money, but this will be more than fully repaid in the improved and increased yields.

Again, the picking and handling of the fruit requires more attention than is usually given. The skin of the fruit is the toughest and most impenetrable portion of it, and forms its natural protection. When, therefore, this skin is injured or broken in any way, immediate access is opened, for fungus spores and bacteria, to the soft, thin-walled, inner tissues of the fruit with their rich stores of sweet food material, which have no powers of resistance and which form a splendid medium for the growth of numerous fungi and bacteria. The consequence of a bruised or cut skin is, therefore, a blackened and decayed fruit; and the more attention that is paid to careful picking and handling, the smaller will be the proportion of the spoiled fruit, on its arrival at the market. The same remarks apply also to care in packing the fruit, and to care in carrying it to the place of export.

Careful attention must also be paid to the grading and sorting of the fruit. Often, fruits of all sizes and conditions are packed together, consequently small and large, good and inferior fruit, sound fruit and fruit in all stages of decay arrive in England together. This is not the way to place produce on the market; the buyer wants to see at a glance what his purchase is worth, and he does not want the trouble and expense of sorting and grading the fruit. Consequently unsorted fruit fetches far lower prices than the same fruit would, if properly graded.

Other points, such as the question of inland and ocean freights which have hindered production in the past, are, it is said, to be looked after by the new company. But, if fruit growers wish to profit fully by the new scheme, they, themselves, must pay more attention to the points mentioned above.

SUGAR INDUSTRY.

Antigua.

The following is taken from the *Antigua Standard* of June 6, with respect to the assistance proposed to be given by the Imperial Government for the reconstruction of the Belvidere Sugar Factory, in the interest of cane farming in that island:—

Memorandum of Conditions accepted by the proprietor of Belvidere estate in consideration of Imperial assistance being afforded towards the remodelling of the present sugar factory:—

1. In order to guarantee the due performance of the public object contemplated, the owner of *Bendals* and the estates associated with it will be required to give a first mortgage of £3,500 over *Bendals* and the estates associated with it.

2. The Government will not demand interest on the £3,500 so long as not less than 1,500 tons a year of *bona fide* peasants' canes are, if tendered at the factory, paid for at not less than 7*s.* 6*d.* per ton under any circumstances, and rising from that minimum on a sliding scale calculated on the basis of 4½ per cent. of the value of 96° grey crystals *f.o.b.* Antigua.

3. The Government will claim interest at 3 per cent., viz: £1 a year, for every ten tons of cane below 1,500 tons, with respect to peasants' canes tendered at the factory and not paid for at 7*s.* 6*d.* per ton.

4. The owner will cease to be liable to repay the loan of £3,500, and will be free from all obligations with regard thereof after 22,500 tons of peasants' canes have been paid for at 7*s.* 6*d.* a ton, or at the expiration of twenty years.

5. The Government shall have power to appoint a Board to determine the order and amount of peasants' canes to be ground daily throughout the reaping season.

6. The owner will, when required by the Government, let any uncultivated land suitable for sugar growing to peasants who will grow canes for the factory, at a rent not exceeding £1 per annum per acre.

7. The Government advance of £3,500 and such sum not being less than £3,500 in cash, or securities to bearer as the owner is prepared to invest in the factory, shall be paid over within a fortnight to a joint account in the name of the Crown Agents for the colonies, and the owner. Payments shall be made from this account against certificates of work or machinery duly delivered and shipped, and such funds as are not immediately required shall be placed on deposit with

a bank approved by both parties, and deposit interest shall be credited to the joint account.

8. The owner shall select the type of machinery and the maker. The Crown Agents shall ascertain through their consulting engineer that the prices quoted are fair and reasonable. The Crown Agents will effect insurances on the machinery in transit.

9. The factory shall be provided with triple effet machinery and appliances, for making refiners' grey crystals and shall be capable of making at least 900 tons of refiners' crystals in 100 days of 14 hours each, or 1,400 tons in 100 days of 21 hours each.

10. The books of the factory shall be accessible to the Government for inspection and audit, so long as the mortgage of £3,500 is outstanding.

11. Subject to revision by the Secretary of State, the Governor shall have power to impose fines, not exceeding in the aggregate £1,000, in place of liquidated damages for any breach of the agreements finally sanctioned by the Imperial Government.

12. If a question arises as to the construction of the final agreement, it shall be settled by the Governor, from whose decision there shall be an appeal to arbitration, on the deposit of £300 in the Local Treasury for the expenses thereof. The Board of Arbitration shall sit in Antigua. The Governor and Owner shall each appoint an Arbitrator, and an Umpire shall be named by the Secretary of State.

It may be added that the conditions above mentioned, will apply to the large Central Factory Scheme referred to in the *Agricultural News:* Vol. II, pp. 99 and 131.

Sugar Imports into the United States.

The *Louisiana Planter* of May 23, gives some interesting figures dealing with the imports of sugar into the United States, during the five years 1896 to 1900. The average total import for these years amounted to 1,755,000 tons. Of this, Java supplied, on the average, 357,300 tons per year; Germany, 320,400 tons; Cuba averaged 313,200 tons, and Hawaii 202,500 tons.

The percentages for these four chief places of supply thus work out :—

Java	20·37	per cent.
Germany	18·27	per cent.
Cuba	17·84	per cent.
Hawaii	11·54	per cent.

Among the minor sources of supply, the British West Indies and British Guiana, together, furnished 10 per cent., Brazil and San Domingo each sent about 3 per cent., while Egypt and Porto Rico each furnished about 2½ per cent.

It is pointed out that Cuba now exceeds both Java and Germany in the quantity of sugar exported to the United States, though in 1897, Germany was easily first, exporting to that country no less than 722,000 tons.

The article concludes with the hope that, soon, the United States will be able to get all their sugar at home.

Bacteria on Fruit. According to the St. Vincent *Times* of May 21, Dr. B. Ehrlich of Strasburg in Germany, states that the surface of fruit is almost always unclean and that it has been proved that cholera, typhus and tuberculosis have been transmitted in this way. The danger, he says, can be partially obviated by peeling or washing the fruit. Pasteur, the great French scientist, is well known to have been keenly alive to this danger.

WEST INDIAN PRODUCTS IN CANADA.

Mr. J. Russell Murray of Trinidad, who has been on a visit to Canada, wrote as follows from Toronto on May 13, in regard to West Indian Products :—

FRUIT.

Jamaica oranges are bought in New York and brought here; this market is a good one, especially on prices. Limes are limited in consumption but are not pushed at all, only a few restaurants using them. They know nothing of the lime-drink as we use it, either with or without Angostura, and I am sure, if it were pushed here and people taught the use of limes and their superiority to lemons, a good trade would open.

PINE-APPLES.

These are largely used and Cuba, so far, supplies the bulk. Those in stock here are poor. Red pines are preferred.

CACAO.

Cacao and chocolate are in general use. West Indian cacao (Trinidad) is looked upon as rather too high in price but is used, owing to its manufactured colour and high flavour. Other West Indian cacao does not appear on the market here at all, and should, I fancy, be able to compete with the African and Java products used, as a cheaper grade, if it were introduced and pushed.

COCOA-NUTS.

Regarding cocoa-nuts, one merchant has sent down a man to buy 2,000,000 nuts mainly, I understand, in Trinidad. The question of size is important, as well as the keeping condition or quality of the nut.

SWEET POTATOS AND YAMS.

In regard to sweet potatos and yams, the market is unpromising both in New York and Canada.

SUMMARY.

Since my coming here I am impressed with the great lack of knowledge of West Indian products and of how and where to get them from the different islands. Toronto, especially, within a few years will largely increase in importance as a manufacturing centre, along with Hamilton, owing to the increase of electric power which is being brought in from Niagara. The Deering Harvesting Co. of Chicago are building a factory at Hamilton and will, by the end of this year, employ 5,000 to 6,000 people. Others are following. Cheap power and Canadian protection are the cause. Hence the future in the Dominion is a good one.

POTASH MANURES.

The following notes on the subject of potash manures are taken from an article on 'The Purchase of Artificial Manures' which appeared in the *Journal of the Board of Agriculture* for March 1902 :—

Genuine kainit contains about 12¼ per cent. potash, besides which it holds over 30 per cent. of common salt. Where, therefore, a farmer wants to use the latter substance, he may find it to his advantage to employ this manure.

Sulphate of potash is offered in various degrees of strength, containing from 25 to over 40 per cent. of potash. Muriate or chloride of potash often holds over 50 per cent. of potash.

All potash manures are apt to be lumpy, and if they are stored long they may become so hard as to be almost unmanageable. Poor mechanical condition is here quite as undesirable as in the case of other manures.

Potash manures are most important for root and leguminous crops, less so for grass and cereals. Whether they are wanted on any particular farm or not can only be determined by experiment.

WEST INDIAN FRUIT.

THE SYMINGTON FRUIT SCHEME.

The following extracts are taken from an article on this scheme in *Our Western Empire* for May 1903:—

The significance of the new economic and commercial departure which is meditated in connexion with the West Indies is that it purposes giving the islands a new industry, and making them the fount of a new trade with the Motherland. What is more, too, this intention is inspired by a comprehension of the wisdom of making use of the waste products of the islands—luscious fruits which, among the most delectable of Nature's gifts, are allowed to rot, all disregarded and all unremunerative. It is hoped that, ere long, we shall see an excellent and increasing trade done in bananas, mangos, pines, limes, grape fruit, oranges and shaddock. What is more, the intention is that these fruits—together with the West Indian fruits with which the British people are acquainted—shall be placed on the market in a specially attractive form. To this end, the harvesting will be done under conditions suggested by wide experience and knowledge, expert pickers will be employed, and the 'conditioning'—a description well known in the fruit trade—and packing, will be in accordance with the latest ideas of scientific fruit preservation. In a word, the natural fruit resources of the islands are to be encouraged by wise organization, by a sedulous anxiety to induce the islanders to pursue their own interests, by a careful fostering of the more wisely practical ideals of peasant proprietorship, and by conveying to the West Indies generally, a sense of confidence in the English market, and of anxiety to co-operate with it. At the basis of this scheme which, by the way, is now known throughout the islands as 'Symington's Scheme'—are influential fruit brokers and distributors, who have undertaken to deal with all the fruit consigned to them.

The first condition of a valuable and profitable trade exists. The islands possess fruit in abundance—in an abundance, indeed, which is simply incomprehensible to our more prosaic European minds. St. Vincent, ravaged though it has been by volcanic disaster, and the victim though it has been of other misfortunes, contains large tracts of virgin soil peculiarly adapted for fruit cultivation. Dominica produces a banana said by experts to be superior to that of Jamaica. In Grenada, pines and oranges grow with a profusion unequalled anywhere in the world.

Several of the most influential brokers in the kingdom have offered to associate themselves with the venture. The fruit exists and the market is generously sympathetic ; and, what is more, there is an abundance of labour ready to hand in the West Indies. Then, several Englishmen of the highest commercial standing—men whose names are synonyms for industrial integrity and enterprise, and who have themselves direct interests with the West Indies—have identified themselves with the scheme, and extended to it a considerable financial support. One incidental purpose of the scheme will be the rehabilitation of the small holder. Hitherto he has been killed, in the industrial sense, by the freight rates. The workers in the islands comprehend that this new organization will compel the reduction of freights—compel it by an economic pressure probably impossible of resistance. The enthusiasm of the workers of the islands is, indeed, one of the prime factors in the confidence of the promoters of the scheme.

The directors are working in harmonious association with the Royal Mail Company. That great shipping organization has given an undertaking so to arrange its freight service as to make St. Vincent, Dominica and Grenada the last ports of call before returning to England. Another tangible evidence of the warm sympathy with which the Royal Mail Company regards the scheme is provided in the fact that it is according it a considerable financial support. The home railways have exhibited a similar sympathetic spirit ; and that the island freights will be reduced to a limit which will allow of a profitable trade is reflected in the attitude of the West Indian authorities. The internal freight question cannot, however, be so serious a matter to the growers under the new scheme as it has hitherto been, because of one significant intention. Depôts will be established to which they will be invited to send their produce, the further conveyance of which to the ports will be undertaken by the company. By the way, this invitation will be backed by an assurance of prompt payment.

EXPORTATION OF ORANGES.

Commenting on Mr. Hart's letter as to the possibility of exporting oranges to England (*Agricultural News*, Vol. II, p. 132), *The Maritime Merchant* of Halifax, N.S., for May 21, says:—

The success of this experiment is important to Canada. If shipments can be made to Southampton by the Royal Mail, we may shortly hope for a similar attempt in this direction. Every new industry that tends to improve the purchasing capacity of the West India people is of advantage to us. We shall shortly be sending them the bulk of their food stuffs, and the more prosperous we find them, the greater will be the volume of our sales.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

We have again to thank Mr. John R. Jackson, A.L.S., for the following article on the London Drug and Spice Market. Mr. Jackson's last article appeared on p. 181 of this volume:—

The drug and spice markets have again, this month, been interfered with by the public holidays of the Whitsun season; no spice auctions were held in the concluding week of the month, and the drug sales were marked by extreme quietness.

GINGER.

At the beginning of May, interest was again centred in the heavy supply, and full prices obtained for Jamaica ginger. At the sale on the 6th. as many as 1,411 barrels were offered, the greater number of which were disposed of at the following prices: Good to fine washed, 52*s.* to 58*s.*; medium dullish to medium washed, 43*s.* to 49*s.* 6*d.*; white, small, dullish fetched 42*s.* to 42*s.* 6*d.* As a comparison, it may be stated that, at the same sale, unsorted native cut Cochin realized 53*s.*; bold sold at 72*s.* 6*d.* to 75*s.*, and selected 85*s.*; good cuttings, 37*s.* 6*d.*; cut tips, 42*s.* 6*d.*; while small cut Cochin was bought in at 52*s.* 6*d.* Of the 1,411 packages of Jamaica offered, as many as 1,000 were sold; while of the 796 packages of Cochin, only 125 changed hands. It was reported at this sale that private advices from Jamaica state there are not likely to be any large shipments late in the season, as was the case last year, and the feeling, generally, was to hold for 'firm prices', which was confirmed by the result of the sale on the 20th., when 460 barrels of Jamaica were offered, and 200 sold, at prices ranging from 53*s.* 6*d.* to 55*s.* 6*d.* for good washed; while fair fetched 48*s.*; and ordinary to medium dullish, 42*s.* to 46*s.* 6*d.* Here, again, the comparison between Jamaica and Cochin was by no means unfavourable, only about 21 packages of this latter quality selling at from 42*s.* 6*d.* for cut tips, and 37*s.* 6*d.* for brown tips; unassorted, native cut, however, was bought in at 55*s.* to 56*s.*, and bold cut at 80*s.*

NUTMEGS.

At the first monthly sale, 19 cases of West Indian were disposed of at rates varying from 2*s.* 3*d.* to 2*s.* 4*d.* for pale; 2*s.* to 2*s.* 1*d.* for fair; 1*s.* 11*d.* for red; and 1*s.* 9*d.* to 1*s.* 10*d.* for pickings. The quotations for good, bold, Penang at this sale were from 2*s.* 6*d.* to 3*s.* 3*d.* At the end of the month, the prices varied but little from the above, but with a somewhat lower tendency. At this sale, West Indian nutmegs sold at steady prices, the amount disposed of being 120 packages.

SARSAPARILLA.

At the auction in the middle of the month, three bales of good Lima Jamaica sarsaparilla, country damaged, were offered and sold at 1*s.* 1*d.* per ℔.; and 1*s.* for fair, sound. A similar quotation of 1*s.* 1*d.* per ℔. was paid for four bales of chumpy Guayaquil, out of fifteen bales offered. Grey Jamaica, which is reported very scarce, sold at steady rates at the end of May at 1*s.* 1*d.* to 1*s.* 2*d.* for slightly country damaged, and 1*s.* per ℔. for native.

KOLA NUTS.

Kola nuts were reported very scarce throughout the month, the price asked being 7*d.* per ℔. at the beginning of the month while, at the auction on the 14th., 6*d.* per ℔. was quoted for dusty, small quarters and halves of West Indian and African mixed. At the last sale good, bright halves from Colombo were quoted at 5¼*d.*, subject, and dark at 4½*d.*

TAMARINDS.

At the first sale of the month, 410 barrels of new Barbados crop were offered, and 16 barrels of good quality sold at 13*s.* in bond. A week later, the report was, that 100 barrels of Barbados had been sold at 12*s.* in bond, while the arrivals, during the week, included 91 barrels from St. Kitt's, 334 packages from Antigua, 34 packages from Montserrat, and 34 packages from Dominica.

LIME JUICE, CASSIA FISTULA' BAY OIL, ETC.

The latest quotation of lime juice was 1*s.* 3*d.* to 1*s.* 4*d.* per gallon, for good, pale, West Indian. Good, raw, West Indian juice is, however, reported scarce, the bulk of that offered being of second rate quality. A consignment of *Cassia Fistula* pods, from Dominica, sold at 22*s.* 6*d.* Canella bark, of good pale quill, was offered for sale on the 27th.; a bid of 40*s.* was refused for this. Other items of this sale were:—Good, West Indian distilled Bay oil, which sold at 5*s.* 10*d.*; while 1*s.* 6*d.* to 1*s.* 7*d.* per ℔. was realized for eleven cases of West Indian distilled oil of lime; and a sample of fair flavoured, St. Vincent musk seed fetched 1*s.* 2*d.* per ℔.

COTTON.

The Value of Cotton Seed.

In *Our Western Empire* for May 1903, there appears a continuation of an article on 'The West Indies and Cotton,' the first part of which has already been summarized in the *Agricultural News* (Vol. II, p. 165).

It is pointed out that one great advantage of cotton cultivation is that it requires no extensive outlay for buildings or machinery, while further, there is little expense in the way of manure, as cotton seed, itself, is an excellent fertilizer.

Dealing with the other uses of cotton seed, the writer states:—

> Besides its utility as a manure, cotton seed fulfils other purposes, but as these imply rather a later development, it is probable that, for a long time to come, the West Indians will not work out these by-products on the spot, but ship the seed to the nearest points at which it can be utilized. It is, therefore, only necessary to allude to these in passing. First, a ton of cotton seed is found to produce from 35 to 40 ℔. of oil; these are the figures given in the Report of the Imperial Department of Agriculture, in the Southern States for extracting oil from cotton seed, and in Texas, £2 10*s.* to £3 per ton is paid for the seed; but we are not told what class of cotton is here referred to, and it is well known that the long staple which is likely to be chiefly cultivated in the West Indies, contains an exceptionally large proportion of oil, while the East Indian cotton seed produces more. It is probable, therefore, that the proportion of oil will exceed the figures above given. This oil is largely used for cattle cake, and in many kinds of confectionery. From the hulls and husks of the seed an American patent has been taken out for paper making, and it is claimed that better and finer paper can be made than from wood pulp. A company is already formed to carry this out and, if successful, it will materially increase the selling value of cotton seed.

The present article concludes with a discussion of ginning machinery. Preference is expressed for the English 'Macarthy' gin for use with long staple cotton, such as will probably be grown in the West Indies.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 175 of this volume.

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NOTES AND COMMENTS.

Cacao Machinery in Trinidad.

The Demerara *Argosy* of May 16, congratulates the cacao planters of Trinidad on the fact that 'Trinidad was the first cacao country to treat cacao mechanically from the pod to the sack, as such is now the case.' The machinery, which has been installed on the Phillipine estate, was made by Messrs. Marcus Mason & Co., New York. The first machine opens the pods, and then detaches the beans from bits of stalks and pod shells. The machine can open 500 pods per minute, and is of value, not only in the saving of labour, but also in lessening the waste by carelessness in extraction, etc.

The next machine is a fermenter; it is a large wooden cylinder, mounted horizontally on rollers, and allows the acid to run freely off. It requires very little attention and, thus, does away with a considerable amount of labour. It is stated that the cacao is more evenly fermented with this machine, than under the present system.

The drier receives the cacao as it comes from the fermenting box, and it is on the principle of a revolving cylinder without any divisions.

Another machine, known as a 'cleaner,' does away with hand cleaning; it is said that one man, by turning a handle, can clean about 10,000 ℔. of wet, fermented cacao in one hour. The *Argosy* mentions, in contrast, that it takes four men and six women 4½ hours to clean, by hand, 4,477 ℔. of similar cacao.

The St. Croix Central Sugar Factories.

In the St. Croix *Avis* of June 10, there appears a proclamation, by His Majesty, King Christian IX of Denmark, dissolving the present St. Croix Central Sugar Factories Company, after it has handed over the factory at St. Croix, together with the machinery, etc., to a new company. We are indebted to Mr. V. Hänschell, of Barbados, for the following interesting note on the subject:—

'The object of the Danish Government is to free itself and the Treasury in St. Croix from further liability. The Danish Government have a claim of about £100,000 on the factory, and the St. Croix Treasury guaranteed, to the shareholders, interest at 5 per cent.; this it has never, since the establishment of the factory in 1876, been able to fulfil.

'The factory has been run, for many years, for account of the Danish Government, and at a loss.

'The new company, if formed, is to give the Danish Government shares to the amount of Kr. 1,500,000—equal to about £81,000—and the guarantee of the St. Croix Treasury is to be abolished.

'I am not aware whether a new company has yet been formed.'

Minor Industries in Grenada.

An article in the Grenada *Federalist* of June 6, draws attention to the way in which the minor industries are, at present, neglected in that island, in spite of the various efforts made by the Imperial Department of Agriculture to encourage them.

It is stated that enough ground provisions are not grown to supply local needs, and that, in consequence, foodstuffs have to be imported from America. Poultry farming, again, is at a very low ebb, it being almost impossible at times to obtain 'the proverbial, "skinny," West Indian chicken.' Stock rearing has been practically given up, and Grenada now depends on the Leeward Islands and the Dutch West Indies for meat.

The consequence is stated to be that, in so far as the food supply is concerned, Grenada is worse off than any of the other islands.

The Export of Cotton from Texas.

According to the British Consul's *Report on the Trade and Commerce of Texas* for 1902, 880,390 bales of cotton were shipped to the United Kingdom from Galveston during the cotton season 1901-2, ending September 1902, while 896,095 bales went from New Orleans; nearly 60 per cent. of the total exports of cotton to the United Kingdom came from these two ports. The value of the exports of cotton, in 1902, from Galveston to the United Kingdom and colonies is given as £7,254,298, and of the cotton seed meal and cake, as £38,271. The greater part of the cotton seed meal and cake exported from this port goes to Germany, the Netherlands and Denmark.

It is noticeable how largely England, at present, depends on the United States for her supply of cotton.

The Turtle Trade of the Cayman Islands.

We have already drawn attention in the *Agricultural News* (Vol. II, p. 151) to the anxiety felt in Jamaica on account of the proposal made by the Government of Nicaragua to impose heavy tonnage dues on vessels engaged in the turtle trade.

The West India Committee have recently addressed a letter (published in the *West India Committee Circular* of June 8) to the Marquess of Lansdowne, regarding the new fishery laws of Nicaragua.

The Committee point out that, according to the new regulations, permits are to be granted to fishing boats for fifteen days only, on prepayment of two silver dollars per day per man, and that the permits will have to be renewed immediately on expiry. With regard to this, the Committee state that, as the boats are fishing for three and four months before they obtain a sufficient catch, it is clear that to return to port every fifteen days would prove a very serious disadvantage, while the men would never have sufficient ready money to pay for the requisite eight permits per man.

The Committee further state that they are credibly informed that, if these regulations were actually put in force, they would inevitably involve the extinction of the turtle fishery of the Cayman Islands. They, therefore, trust that his Lordship will communicate with the Nicaraguan Government, at an early date, regarding this matter and endeavour to obtain some measure of relief.

It is certainly to be hoped that the Nicaraguan Government will reconsider their proposals; the dues, if imposed for revenue purposes, will obviously defeat their own object.

Canadian Exhibitions, 1903.

In his address before the British Guiana Royal Agricultural and Commercial Society on June 16 last, the Imperial Commissioner of Agriculture spoke on the subject of the representation of that colony at the Canadian Exhibitions to be held in September next.

The Commissioner said that the colony's exhibit last year at the Toronto Exhibition was a most creditable one, and he eulogised the services of Mr. Charles Pickford, of the Pickford and Black line of steamers, in putting up the exhibits in an attractive manner and assisting in other ways in contributing to its success. Other exhibitions were to take place at Toronto and Ottawa in September next, and Mr. Pickford was willing, as before, to carry all exhibits from the West Indies free, and to arrange and look after them during the exhibitions. The Commissioner urged that exhibits should be sent from British Guiana, care being taken to send exhibits of sugar and rum and good samples of other produce suitable for export.

We would add, to the information then given, that the exhibition at Toronto will open on August 31, and close on September 17, and that the Ottawa exhibition will open on September 11, and close on September 19. All exhibits for the Toronto Exhibition should be shipped by s.s. *Oruro* leaving Demerara on July 22, Trinidad July 25, Barbados July 28, Antigua August 1. The exhibits for the Ottawa Exhibition might leave by the next steamer, s.s. *Dahome*, but it would be more convenient if they could be ready to be shipped at the same time as the Toronto exhibits and specially marked 'Ottawa exhibits.' It is hoped that the West Indian Court at these exhibitions will be fully up to the standard of last year, when it received the highest award—a Gold Medal. In a letter addressed to the Commissioner of Agriculture on June 16, Mr. Charles S. Pickford said: 'You may depend on my doing my utmost to make the exhibits at Toronto and Ottawa a success.'

Barbados Bananas.

In May 1902, Commander W. H. Owen, R.N.R., the local Superintendent of the Royal Mail Company, invited the Imperial Department of Agriculture to test a new 'fruit carrier' in which it was proposed to convey bananas from the West Indies to England. In order to ascertain whether the 'new carrier' was any improvement on the method adopted in the Canary Island trade, a bunch of bananas was packed in the usual Canary Island way, by wrapping it in cotton wadding, paper and wood wool *(Agricultural News*, Vol. I, p. 68). The bunch packed according to the Canary method arrived in England in excellent condition and was reported to have had a particularly fine and clean appearance. In the July following, Mr. J. R. Bovell, the Superintendent of the Botanic Station, forwarded two similar bunches of the Chinese or Dwarf banana to England, packed like those sent from the Canary Islands. These bananas were also favourably reported upon *(Agricultural News*, Vol. I, p. 134).

Since then, with the ready help of Commander Owen, a steady and successful effort has been made to establish a banana trade between Barbados and England. In connexion with this, very great assistance has also been rendered by Mr. F. Pink, of Messrs. Pink & Sons, Portsmouth, who has carefully reported on each consignment, pointing out, when necessary, any mistakes made and giving much valuable advice.

At first, owing to a want of knowledge as to the best time to cut the fruit, several shipments arrived over-ripe. Since then, this difficulty has been, to a great extent, overcome and later reports are much more satisfactory. The latest received from Mr. F. Pink is as follows:—

'This is decidedly the best consignment which we have received and some of the bunches are almost perfect. Those packed in the field are certainly the best and show hardly any signs of bruising. We do not think we have ever seen better anywhere.'

From the foregoing it is evident that, with care in selecting and packing the fruit and handling the crates in transit, there is every reason to believe that a profitable trade in bananas, within reasonable limits, could be worked up between Barbados and England. In any case, the action taken by the Imperial Department of Agriculture has, so far, been fully justified.

Planters having suitable land and desirous of embarking in banana cultivation are advised to apply to Mr. J. R. Bovell, F.L.S., who will be happy to afford any information in his power.

INSECT NOTES.

Antigua.

The following notes are taken from a report prepared by Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, after his recent visit to Antigua in March and April last:—

The plants at the Botanic Station were on the whole in very good condition so far as insect pests were concerned. A large number of scale insects and other pests are recorded from Antigua, and several occur on the plants at the Botanic Station. They are, however, kept well in check by the liberal use of insecticides.

A white fly, *Aleurodes* sp., was found abundant on an ornamental *Solanum* and the Brown Shield Scale *(Lecanium hemisphaericum)* was found on a variety of plants. These, with the Black Line Scale *(Ischnaspis filiformis)*, seemed to be the most troublesome insect pests at the Botanic Station. The Black Line Scale has evidently nearly the same range of host plants in Antigua as in St. Kitt's, and is found to be resistant to the ordinary methods of treatment. The West Indian Red Scale *(Aspidiotus articulatus)*, which I did not find at St. Kitt's, occurs here.

I was informed that the insects attacking the sugar-cane have been much less serious during the past season than in previous years. This is attributed, in large measure, to the adoption of the methods recommended by Mr. Maxwell-Lefroy, such as cutting out dead hearts for the Moth-borer, and burning rotten canes to kill the Weevil borer.

Two pine-apple plantations were visited and carefully examined. The fruits were not far enough advanced to show the dead centres which are reported to be due to insects.

The 'Jacobs' *(Cryptorhyncus batatae)* of the sweet potato is a serious pest. Its attacks seem to be worse in dry seasons, in dry soils, and in soils with a large proportion of straw or other organic matter, while potatos planted on heavy clay soil or on damp soil are reported to suffer less. Planting on those soils in which the Jacobs has been found to be least destructive would thus seem to be one method of avoiding severe attack. Another method would be to plant some other crop on the land which has borne a crop of potatos infested with this pest. Since animals will not eat the potatos infested with Jacobs, the larvae cannot be destroyed by feeding to the hogs, but if the badly infested potatos were put into a deep hole and well covered with quicklime and this with at least 2 feet of earth, many of the insects would be destroyed.

Ticks on cattle have caused serious trouble at Antigua in some years, and the 'St. Kitt's' or 'Gold' tick has been the species that has caused most trouble. I was unable, at the time of my visit, to find any specimen of this parasite and was informed by several persons that it was out of season.

At one estate I visited, the stored Guinea corn was badly infested with a small moth, probably the Angoumois grain moth. Carbon bisulphide would be the best remedy, but I was informed that it cannot be obtained in Antigua. Fumigation with hydrocyanic acid gas would be effective but would be more expensive, probably, than the carbon bisulphide treatment, as the corn would have to be placed in trays or racks to allow for the penetration of the gas.

At the same estate, I saw a field of cotton from which most of the crop had been gathered. The stalks of the plants were badly infested with scale insects, principally *Asterolecanium pustulans* while the bolls and leaves were infested with Red-bug which is identical with, or closely related to, the Cotton Stainer of the United States. I suggested that the cotton plants should be cut and either piled up or thrown into windrows for a few days and, when most of the red bugs had collected on the plants, the heaps should be burned, thus killing the scales and many red bugs. Cotton is also attacked by the larvae of a moth, probably the Cotton Worm *(Aletia argillacea)*. Hand-picking of the caterpillars and spraying with Paris Green are the remedies which have been tried, the latter with good results.

The growing corn in Antigua, as in St. Kitt's, is attacked by caterpillars that eat down into the heart of the plant and do considerable damage. There is also a caterpillar which eats into the young ear. The former is checked by dusting ashes, land plaster or very fine, dry dirt into the centre of the plant, but the habits of the latter are not well enough known, as yet, to suggest any remedy.

One old plantation of lime trees, which I visited, was badly infested with scale insects. On these trees, I found the West India Red Scale *(Aspidiotus articulatus)*, the Orange Snow Scale *(Chionaspis citri)*, the Mussel Shell Scale *(Mytilaspis citricola)*, and *Lecanium* sp. The young trees on the same estate were very vigorous and quite free from scale. Mr. Sands reports that, at the Botanic Gardens, the Brown Shield Scale on *Eranthemum* is regularly attacked by a fungus which is of great assistance in keeping the scale in check. It does not, however, seem to be spreading to the other plants. The leaves of a mango at Liberta showed some of this fungus on the same *Lecanium*.

BIRD NOTES.

Importance of protecting Wild Birds.

In a recent issue of the *Agricultural News* (Vol. II, p. 173) brief mention was made of the Old Witch or long tailed blackbird *(Crotophaga)* as a destroyer of grasshoppers, mole crickets and other insects harmful to the agriculturist. As illustrating the importance of carefully weighing the evidence for and against insectivorous birds, before deciding on their destruction, the following extract from a recent report by the Agricultural Instructor at Dominica will be read with interest:—

At a meeting of the Dominica Agricultural Society held on April 14, a discussion took place on the subject of the tick bird of Dominica. This bird is said to have helped in the spread of scale insects on the lime trees, owing to its habit of feeding on the lady bird beetles which are supposed to keep these scale pests in check. In defence of this bird, I may state that I recently had an opportunity of seeing the stomach of a tick bird cut open soon after it was killed. The contents were five 'cotton stainers' and two small grasshoppers. As cotton is likely to become one of the industries of Dominica, I would suggest that it would be advisable carefully to consider whether these birds are as harmful as is generally supposed. The present tendency is to destroy them completely and many have already been killed.

FISH CURING INDUSTRY AT BARBADOS.

The following extract is taken from the *Agricultural Reporter* of June 15 last, relative to an experiment, that is being tried, in curing flying fish for consumption at Barbados or for export to the neighbouring islands:—

> We learn that Mr. G. W. Hunt, of Cheapside, Bridgetown, who claims to have had considerable experience and to have acquired a good knowledge of the art of curing fish, has obtained, through the Imperial Commissioner of Agriculture, the use of a shed on 'The Reef' for carrying on a curing business. The shed is one of those purchased from the Military Authorities by the Board of Health during the recent small pox epidemic and set up on 'The Reef' for the accommodation of persons quarantined on arrival here from places where other infectious diseases are epidemic, and measures 60 feet by 12 feet. Mr. Hunt will confine his attention at first to the curing of 'flying fish,' of which he hopes to turn out from 500 to 1,000 barrels every season. The Imperial Commissioner is, as has been intimated above, taking a lively interest in the matter and has expressed his willingness to give Mr. Hunt any assistance in his power.

Mr. Hunt is to be commended and encouraged in taking the initiative in this industry. There is money to be made in this business; but, as we recently pointed out, there is need of knowledge. Fish curing is an art that must be learnt. The knowledge involved may not be difficult to acquire, but it is essential to the successful pursuit of the business. If a market is to be secured abroad, the curing must be well done; and in order to cure well, the requisite knowledge must be acquired. It is a question of teaching, and the Government should provide the necessary teachers.

LEAF DISEASES AND THEIR TREATMENT.

Leaf diseases of cultivated plants in the West Indies, although very common, are not economically so important as are those attacking root and stem. The so-called 'black blight' on trees is not a parasitic fungus, it is a pure saprophyte which lives on the dead bodies and excreta of scale and other insects. It does a certain amount of damage by cutting off the light from the leaves, and so preventing the manufacture of starch, etc., which takes place in the leaves of plants in sunlight. Black blight is best removed by spraying the tree with a wash to destroy the scale insects.

Other leaf diseases, such as the 'leaf-rust' of the tomato, are due to parasitic or semi-parasitic fungi. These cause loss to the plant by interrupting the performance of the functions of leaves—respiration (the taking in of carbonic acid gas), the giving off of oxygen and of water vapour, and the manufacture of starch and sugar.

Leaf diseases can often be cured by proper treatment. Spraying with dilute potassium sulphide solution or with Bordeaux mixture will often check them, if resorted to sufficiently early, and it should be repeated at short intervals. If the disease has previously existed in any locality, the young leaves should be sprayed before the disease appears.

As with stem and root diseases, the parts affected should be removed and burnt.

Information as to spraying mixtures, their manufacture, cost, and the methods of applying them can be found in Pamphlet No. 17 *(General Treatment of Fungoid Pests)*, published by the Imperial Department of Agriculture.

PLANTS AND ELECTRIC LIGHT.

A description has already been given in this journal of the introduction of the Gambier plant into the West Indies *(Agricultural News,* Vol. II, p. 158). On the voyage out, an experiment was made with a view to testing the question whether electric light could be made a substitute for sunlight with delicate plants. The results of the trial are given in an article by Dr. (now Sir Daniel) Morris in the *Kew Bulletin*, 1891, and reprinted in the *West Indian Bulletin* (Vol. iv., p. 81), from which the following extract is taken:—

> Owing to the cold weather, the cases on board the *Atrato* were placed below in the main saloon. There was very little direct light in the day-time, but the question of warmth was, for the moment, of more importance than that of light. It was also hoped that they could be placed on deck in a day or two at the most. The weather during the whole of the first week, however, continued very cold, and it was impossible to expose the plants on deck. Under these circumstances it was fortunate that the electric light, with which every part of the ship was supplied, was available to try an experiment of some interest. Although the plants received very little light during the day, they had a good supply of electric light during the night, and the particular plants that were more fully exposed to the electric light were afterwards found to be in a much better condition than the others. It is well known that plants will thrive under the influence of artifical light, but in this instance there was so little direct light available during the day that the plants had to depend almost entirely on the light they received at night. The gambier plants are particularly sensitive as regards a diminution of light. In the present instance, the plants were placed below on November 12, and were removed on deck on November 19. Here they were placed on a hatchway on the starboard side, and shaded from the direct rays of the sun by an awning. In order to make myself acquainted with the exact condition of the plants before they left my charge, the cases were opened on November 22, about thirty-six hours before arriving at Barbados. All the plants were in good order; a few, it is true, had lost their leaves, but the greater number were in excellent condition. The case in which the plants had suffered most was one of the two intended for the Jamaica gardens. This had been placed with its end towards the electric light, and, in consequence, had received less direct light than the others. The use of electric light for the safe transit of such valuable plants as are obliged to be despatched from this country during the winter months is evidently capable of being greatly extended. It may also be utilized in the case of tropical plants arriving in this country from abroad, during the prevalence of cold weather. Such plants could be placed below directly the weather is becoming too cold for them on deck, and then the more electric light they have the better. The reports received respecting the gambier plants on arriving at their destination were as follows:—*Jamaica, December 1:* 'Thirty-four plants in good order, eight in fair order, thirty-eight somewhat weak;' *British Guiana, December 3:* 'The plants arrived safely, all living;' *Trinidad, December 17:* 'All the plants arrived safely, the lower portion growing freely;' *St. Vincent, December 19:* 'Fifteen plants in good order, seven leafless, ten dead'—these plants were overcarried by the *Esk* to Trinidad and La Guayra, and returned to St. Vincent ten days late; *Dominica, November 28:* 'The plants arrived in good condition.'

REARING OF DUCKS.

In his second article, Mr. Barclay continues his notes on the breeds of ducks:—

THE AYLESBURY AND PEKIN.

The most popular breeds of ducks are the Pekin (in the United States), and the Aylesbury (in the United Kingdom). Both are white birds, but present many differences which, if once known, will enable them always to be distinguished from each other. The Aylesbury is pure white, with orange coloured legs, and a flesh coloured bill, the legs are placed near the middle of the body, so that it carries itself nearly level. The Pekin, on the other hand, has a canary or faint yellow tint in its white, has an orange coloured bill, and orange coloured legs, which seem to be placed farther back than in the Aylesbury, so that it carries itself with head erect, sloping down behind. In these white breeds, some people have a difficulty in distinguishing the drake from the duck. The tail of the drake curls back, while the duck's tail goes straight to a peak and while the cry of the drake is husky, that of the duck is a clear quack. Both varieties are large, grow quickly, are good layers, do not readily become broody and are splendid table birds.

In spite of these manifold good points, I would not recommend either variety as profitable birds for the West Indies. With birds, as with animals, white is not a colour that seems to be adapted for the tropics. So, except at high elevations, where there is an abundance of water and heavy shade available, these breeds should not be kept.

In Jamaica, both Pekins and Aylesburys have continually been imported and tended with all care and, while in some upland parts they have thriven fairly well, I have never known of what may be called very good success with them, such, for instance, as the same owners, with the same conditions, have had with Muscovys. Often complaints have been made that Pekins have never laid any eggs. I have generally found this to be partly due to fat caused by feeding corn as an unvaried diet, and partly also to the natural inertia of large, white birds in a hot country, where there was not a running stream, nor a large enough stretch of water or marsh, to provide exercise in seeking food. A small pond under such conditions, is not enough, as it does not give room for food seeking, the ducks exhaust all opportunity of that in an hour. Again, complaints have been made of eggs from these breeds not hatching. Time after time, people have reported that they have set Pekin duck eggs and found them to be infertile. This has been through two causes: firstly, as already stated,—fat, which develops liver disease and causes a dullness, droopiness and disinclination of the drake; secondly, through not having a sheet of water to swim in, when the mating with the ducks would more naturally be completed. Under dry land conditions, when very active, the drakes of these will readily mate with the ducks, just as the Muscovy does, but not when in any way out of condition; they are always surer with water. The eggs of the Aylesbury and Pekin ducks are generally white.

THE ROUEN.

Another fine variety, most attractive in appearance, is the Rouen. This breed, in colour, is exactly the same as the Mallard or wild duck. The drake is very handsome, with a glossy, velvety, green head and neck, and many coloured feathers, but the duck is a more plainly coloured bird of a dull drab-yellow. The Rouen grows to a larger size than any of the preceding, and develops more slowly than the Pekin or Aylesbury. The eggs are generally green; they are not such good layers as the Pekin and Aylesbury, though better than the Muscovy. They are hardy and active, but *must* have a large sheet of water, or marshy ground to feed upon, otherwise they will not thrive well, the progeny soon becoming reduced in size. Given these, this is a fine breed and incomparably the best of those yet mentioned for the table, being as much superior to the Muscovy as cheese is to chalk, or as a new laid egg is to a stale one.

THE INDIAN RUNNER.

The best laying variety of ducks is the Indian Runner, which of late years has been greatly developed in England. These ducks are small, very active, and more like wild fowl; they run rather than waddle awkwardly like other ducks, can thrive without water (though better with it) and find a large portion of their food, if given a wide range. They lay a large number of eggs and do not want to sit much, if at all, and their eggs are very like hen eggs in flavour, free from the rank flavour duck eggs often have, especially those of the Muscovy. The eggs are large and white with a dull smoothness, very easily distinguished from a hen egg. Although small, these birds are very fine for table, having the flavour of game birds, much like the Rouen. The Indian Runner is *the* breed of all the improved modern breeds for the West Indies, and as both drake and duck lend themselves readily for crossing, size can be obtained by those who wish, fine, large, healthy, goodlaying, economical table birds, by crossing these with any of the preceding breeds, or those to be mentioned afterwards.

BUFF AND BLUE ORPINGTON, ETC.

Two new breeds of ducks are the Buff and Blue Orpingtons, both magnificent breeds. The former is the better layer, the latter the better table bird; but I have not yet had experience with either in the West Indies. At an Agricultural Show in Jamaica some years ago, visitors were very interested in, and curious about, two yellow ducks shown (there was unfortunately no drake) and could not understand what they were. These were Buff Orpingtons. There are other varieties, less well known, all of which have their admirers who keep them, such as the Black Cayuga, the Blue Lundisk, etc., but any of those described can be used to suit any conditions in the West Indies.

(To be continued).

Banana Flour. A firm of native merchants in Calcutta, who have been experimenting in the manufacture of banana flour, have met with such success that, according to the *Anglo Indian Review*, they have ordered a complete plant for large production. There seems every prospect of a good English trade in the industry. An analysis, conducted by Mr. David Hooper, F.C.S., of the Indian Museum, shows that the Indian-made product contains about the same quantity of carbohydrates as the West Indian, and is about 1 per cent. richer in albuminoids. Its nutritive properties exceed that of arrowroot and other starchy foods usually administered to invalids. (Demerara *Argosy*: May 16.)

OUR BOOK SHELF.
NOTES and REVIEWS.

LESSONS ON COUNTRY LIFE: By H. B. M. Buchanan, B.A. (Cantab.) and R. R. C. Gregory. *London: Macmillan & Co., Ltd., 1903.* Price 3*s.* 6*d.*

The sub-title of this book describes it as 'a guide to the study of the animals of the farm, their habits, uses and treatment, together with notes on the wild animals, wild birds and injurious insects common to our [English] woods and fields.'

The animals of the farm described are the horse, cattle, the sheep, the pig, the dog, and poultry, and it is this part of the book which should prove most serviceable to residents in the West Indies.

Under the heading of 'The Horse' an account is given of the points of a horse, followed by a description of the various domesticated varieties, their uses, structure, descent and characteristics, and then by a short account of the horse family. We next have a chapter on 'Stabling, Grooming, Feeding,' in which stress is laid upon the necessity for thorough cleanliness and general sanitation. There follow chapters on 'Food and Digestion' and 'Food.'

The other animals are treated in a similar comprehensive manner, the account of cattle being especially full of interesting and important facts.

The notes on wild animals and birds and on insects, though not so directly applicable in the West Indies, are still full of interest.

We are glad to notice that the authors lay stress on the point that 'the lessons should always be given from objects, in order that the pupils may see, handle and examine for themselves, and thus be led to think, question, and form their own conclusions.'

The book is intended for the use of teachers in country districts in England, and can be thoroughly recommended to teachers and others who are interested in wild or domesticated animal life in the West Indies. The illustrations are numerous and excellent.

Introduction of Animal Plagues. In the *Annual Report* (No. 73) of the United States Department of Agriculture for 1902, the Hon'ble James Wilson, the Secretary, refers to the importance of maintaining strict quarantine at the sea ports, as a means of preventing the introduction of animal plagues. He says:—'One of the most important duties of the Bureau of Animal Industry is to maintain strict quarantine at the ports of the seacoast in order to prevent the introduction of animal plagues. The efficiency of this service has been shown in the past, and it is a service by which the live-stock interests of our country are directly conserved. The live-stock growers demand and receive the most rigid inspection at these ports, for it would be no difficult matter to permit the introduction of diseases which might easily cost the live-stock growers many millions in direct losses, and at the same time the Government would be under heavy expense in efforts toward their eradication.'

DEPARTMENT NEWS.

News has been received in Barbados, by cable, that His Majesty the King has been graciously pleased to appoint Dr. D. Morris, C.M.G., Imperial Commissioner of Agriculture for the West Indies, to be Knight Commander of the Most Distinguished Order of St. Michael and St. George.

At the invitation of Sir Gerald Strickland, K.C.M.G., Governor of the Leeward Islands, the Imperial Commissioner of Agriculture embarked for Antigua in R.M.S. *Eden* on June 23 last. There are several interesting questions under consideration in the Leeward Islands, with the view to assisting the sugar industry and also in extending cotton cultivation. Sir Daniel Morris will probably return to Barbados to-day (July 4).

The Hon. Francis Watts, the Government Analyst and Agricultural Chemist for the Leeward Islands, who proceeded to England on April 11, on special leave, in connexion with proposals to establish a central sugar factory at Antigua, did not return, as was anticipated, by last mail.

The Secretary of State for the Colonies has approved of Richard A. Stoute, Doctor in Veterinary Surgery of the American Veterinary College of New York, being appointed Consulting Veterinary Surgeon in connexion with the Imperial Department of Agriculture.

Mr. Murdo McNeill, Agricultural Instructor at Grenada, has been granted leave of absence, owing to ill-health, and his duties will be performed by Mr. W. M. Smith, a local planter, until further notice. It is hoped Mr. McNeill will soon recover his health and resume the useful work in which he has been engaged at Grenada.

Mr. Archibald Brooks, of the Royal Gardens, Kew, the newly appointed officer-in-charge of the Agricultural School at Dominica, arrived at Barbados in R.M.S. *Para* on June 22 and landed at Dominica on June 24.

QUEEN OF FLOWERS.

In a recent issue of the *Agricultural News* (Vol. II, p. 170) we drew attention to the difficulty experienced in obtaining young plants of this tree. With reference to this, the Rev. R. J. Clarke, Grace Church, St. Lucia, writes:—

> In 1884 I found a tree here on the Riviére Dorèe estate, then about five years old. During the four succeeding years it flowered and seeded heavily, but of the many thousands of seeds not one produced a tree. I tried in vain, from root and branch, to obtain a plant. In the fifth year of seeding, however, about 75 per cent. of the seeds which fell produced healthy, strong trees without any assistance whatever. One of these seedlings, planted out at the Rectory, also flowered freely every year after it was two years old, but only produced fertile seed in its 7th. and 12th. years. I shall be glad to send you some plants if required.

GLEANINGS.

We learn that the Hon. William Fawcett, B.Sc., Director of Public Gardens and a Member of the Board of Agriculture of Jamaica, has been appointed to act as Chairman of the Board until further notice.

The West India Committee state that the British Cotton Growing Association has decided to send out a power gin and press to Antigua immediately.

The British Honduras mahogany *(Swietenia macrophylla)* is in cultivation, and has produced seed, at the Royal Botanic Gardens, Calcutta. The plants were raised from Honduras seed, obtained through the India Office, in 1872.

The Demerara *Argosy* of the 20th. ultimo states that fifteen barrels of Demerara seedling canes, of the varieties 109, 115, 116, 117, 130, 132, 135, 145, 625, 711, 721, 1,438, 1,640, 1,880 and 2,190 were shipped to the Botanic Gardens, Jamaica, on the 18th. ultimo. On the same date, a box of elephant variety was shipped to the Commissioner of Agriculture, Barbados.

The Hereford bull, obtained for St. Vincent by the Imperial Department of Agriculture, is reported to be in splendid condition, and his services have been fully utilized in the island. He has lately been transferred from Ratho Mill to the care of Mr. J. G. W. Hazell, at Queensberry estate, Buccament Valley. The China Poland boar has been placed under the care of the Hon. C. J. Simmons, at Diamond estate, Brighton.

Mr. J. C. Moore, the Curator of the Botanic Station, St. Lucia, writes pointing out the enormous carrying power of some trees when in fruit. A specimen of *Dillenia speciosa* growing at the Botanic Station in that island is 42 feet in height and 4 feet in circumference at the base of the stem. It recently had at one time about 1,240 fruits, averaging 28 ounces in weight each. This gives a total weight of 2,170 ℔., or nearly a ton.

The *West India Committee Circular* for May 25, mentions that his Excellency Sir James Swettenham, K.C.M.G., the Governor of British Guiana, has submitted to Mr. Chamberlain a report on the introduction of steam ploughing on the Vergenoegen sugar estate on the west coast of Demerara. It is stated, that although the management have not yet secured a perfectly satisfactory plough, the experiment has shown that steam ploughing may become a practicable operation on many of the sugar estates in the colony.

According to M. Blanc, French Consul at Smyrna (Asia Minor), 22,009 bales of cotton were exported in 1901. (*Revue des Cultures Coloniales:* May 20, 1903.)

The Demerara *Argosy* of June 20, states that 15,542 ℔. of native balata, valued at $3,904·80, were shipped to England by the mail of June 18. By the same mail were also shipped 10,512 ℔ of foreign balata, valued at $4,474·29.

According to the *Board of Trade Journal* for March 26, the trade of Martinique, which from 1899 to 1901 averaged 52,000,000 francs (nearly £2,000,000), fell to 36,000,000 francs (about £1,350,000) in 1902, in consequence of the eruption of Mont Pelèe.

It is feared that the recent extremely heavy rainfall has adversely affected cultivation. The rains have rendered the dams almost impassable. Grinding is being carried on with much difficulty and several factories have been obliged to cease work. (Demerara *Argosy:* June 17.)

Our weekly commercial report from Mincing Lane has been steadily urging the growing of cotton in Ceylon, in view of the shortage of supplies to the British market. Cyprus has sent some excellent samples, and cultivation in that island is likely to be encouraged. (*Tropical Agriculturist:* May 1, 1903.)

The *Ceylon Independent* estimates the annual production of cocoa-nuts in that island at not less than 800 million nuts, of which nearly 400 million are sent away in the husk, in the shell, as oil, and after dessication, and the remainder used for various purposes by the people of the country.

The Farmer and Stockbreeder of May 18, states that the result of experiments conducted in Wales, during the past year, in the spraying of potatos with Bordeaux mixture, shows that not only is disease checked, but the yield of potatos is increased, by its use. In Ireland, the spraying of the potato crop is more extensively practised than in England and with, on the whole, good results.

In comparing the imports into England during March last with those of March 1902, the *Chamber of Commerce Journal* for May 1903, mentions that cacao and coffee were both higher, while tea declined by 7,933 ℔., and increased in value by £13,446; there was, again, a decrease in sugar amounting to 456,709 cwt. Unmanufactured tobacco increased, and the manufactured article decreased. Raw cotton was 352,650 cwt. (23·4 per cent.) more in quantity and £1,137,156 (30·1 per cent.) higher in value.

Steps are apparently being taken in British Guiana to start the cotton industry among small cultivators on sound and practical lines. The Demerara *Argosy* of June 20, states that Mr. Bruce-James, the Agricultural Instructor, recently visited the Buxton village taking with him a large quantity of cotton seed for distribution. In the course of his address to farmers in that district, Mr. Bruce-James recommended the formation of a local joint-stock company to purchase their own ginning machine, and advised growers to ship their produce direct to the home dealers and to avoid the middleman as far as possible.

EDUCATIONAL.

Education in Grenada.

The following extracts are taken from the Annual Report of the Grenada Board of Education for 1902, under the head of 'Imperial Department of Agriculture':—

The Imperial Commissioner kept in touch with the Elementary Education Department of this Colony throughout the year. In January, there was laid on the table of the Board of Education a pamphlet entitled *Hints for School Gardens.* A letter from the Commissioner forwarding it was read. In August, a Schedule of Object Lessons and Nature Teaching with a list of Exhibition Prizes attached, was submitted by the Commissioner for adoption by this colony.

At nearly every meeting of the Board of Education, slight progress was reported in agricultural teaching. No work on the practical side was done during the year. At this date, several plots have been laid out and prepared, the fencing for them is in the colony, and managers and teachers have been notified that the Result Grant at the next round of examinations, to begin in November of this year, will be as hitherto on the theoretical side, with substantial addition, payable in a lump sum immediately after the examination, for practical work in gardening. There has been no opposition to the scheme, and the Commissioner has been assured of the hearty co-operation of school managers.

On the theoretical side, some very thorough teaching has been done during the year. The examinations comprise questions on the following heads:—

- *a.* The atmosphere, in its relation to plant life (very elementary stage).
- *b.* Germination of seeds.
- *c.* The uses of roots, stems and leaves.
- *d.* Draining, manuring and forking.
- *e.* Treatment of different kinds of soil.
- *f.* The cacao tree.

I am of opinion that pupils will now be anxious to put the theory so learned to practical use in the schools. Every teacher seems to recognize the full meaning of what is being done, if I may be guided by the interest displayed in the examination of this subject.

The Importance of Geography in Education

In a previous number of the *Agricultural News* (Vol. II, p. 154) reference was made to an interesting paper by the Right Hon'ble James Bryce, M.P., which appeared in the *Geographical Journal* for March 1902, on the subject of 'The Importance of Geography in Education.' The following extract, referring to the importance of geography in connexion with commerce, should be of interest to persons engaged in commercial pursuits or qualifying for commercial life in the West Indies:—

This commercial side of geography has two aspects. It may be considered either as a question of the direct and immediate utility which it has for the manufacturer or the exporting merchant, or it may be considered as tending to aid in the general expansion of his views and his comprehension of the financial and commercial conditions of the world. Of course it is true that a manufacturer or an exporter will primarily rely upon the direct reports which he receives from his agents abroad. Every considerable manufacturer or exporter, as the case may be, will probably have an agent, or at any rate some adequate source of information, although, no doubt, our merchants have not yet done all they ought to do in providing themselves with such means of information concerning the different markets of the world, so that they may know whence they can best obtain their materials and whither best send their manufactured products. Although it is chiefly upon these direct reports, by trained observers on the spot, that the merchant will rely, he will comprehend the whole subject a great deal better if he has acquired a general mastery of the commercial geography of the world, if he knows the producing areas and the markets and the lines of transport as a whole. A great commercial man, whether he be a great manufacturer or whether he be a great exporter, can develop for himself certain lines of commercial action; he can frame a large policy upon which he can conduct his operations. In the same way as a general would determine where to distribute his forces, so he will consider where he can best get the materials he wants and to what markets he ought to send them. His wider knowledge of the world as a whole will enable him to take not only a more intelligent, but a more practical and serviceable, view of what ought, in each particular case, to be attempted.

DEPARTMENTAL REPORTS
RFM

TOBAGO: ANNUAL REPORT ON THE BOTANIC STATION, 1902-3. By H. Millen, Curator, and N. Lord, Agricultural Instructor.

The expenditure for the year amounted to £628 7*s.* 10*d.*, while £35 12*s.* 2*d.* was realized by the sale of plants.

The season was a remarkably wet one, the rainfall recorded at the Station (101·05 inches), being the heaviest since the Station was established. In consequence of the heavy rainfall during the reaping season, the cacao crop, Mr. Lord states, was not so good as had been anticipated.

At the Botanic Station, economic plants, such as rubber, pine-apples and garden vegetables, are said to be doing well; onions did not succeed as the 'seed' reached the island too late for the planting season. It is proposed to make a further trial during the present year.

Parasol ants and rats are stated to have been very destructive to the crops.

AGRICULTURAL SOCIETIES.

Trinidad.

We learn from the *Port-of-Spain Gazette*, of June 18, that a meeting of the Trinidad Agricultural Society was held on June 9. A letter from Mr. W. Weldon Symington to his Excellency the Governor, explaining his fruit scheme was read by the Secretary. A letter was read from Mr. J. H. Hart, F.L.S., stating that he had 700 ℔. of cotton seed available for distribution. The Secretary mentioned that he had received from England the Trinidad Agricultural Society's Silver Challenge Medal, which is to be competed for yearly by the schools at the Agricultural Show. The local subscriptions to the 'Sir Nevile Lubbock Testimonial Fund' were said to amount to $788.

Guinea Fowls.

The following notes on Guinea fowls, reproduced from *The Farmer and Stockbreeder* of May 2, will be of interest to poultry keepers in the West Indies:—

There is plenty of profit in Guinea fowls for those who understand their management, and who have a suitable place in which they can be reared. It is not always a good plan for the farmer to take up these side lines, as it were, in poultry-keeping; but where there is ample room, and the farmer does not mind birds which stray some distance over the land, Guinea fowls can be kept to considerable profit. Guinea fowls ought not to be mixed up indiscriminately with ordinary poultry, because they are of a rather pugilistic tendency, and they interfere very often with the barn-door fowl. Where, however, poultry are kept under modern principles, being divided up into roosts in different corners or angles of the farm, there ought not to be any difficulty in arranging for some Guinea fowls to be kept as well. The fact is, that three to four Guinea fowls will lay a sufficient number of eggs to enable the farmer to raise quite a large flock of young birds, and that is where Guinea fowls pay. They are not profitable to keep, as poultry are, for egg production, because their eggs are small, and, on the other hand, it pays well to hatch the eggs, either under hens or in an incubator, and rear the young birds, which can then be marketed. They are very curious birds, these Guinea fowl; they like to perch themselves up at night on the highest trees, far out of anybody's reach, and at the approach of a stranger they start screeching to such an extent that they have often been called the 'farmers' watchdogs.' They will be found to be fairly hardy and, when once started in life, should be allowed to roam out at will over the fields and through the woods, if woodland be available. They require plenty of opportunity for obtaining insects, such as a small wood or coppice can well afford, or else they must have a liberal amount of shredded meat in their food, which will take the place of insect life. Biscuit meal, containing shredded meat, and some good, dry, coarse oatmeal is suitable for food. In other respects, treat them just as young chickens may be treated, and they will well repay attention.

Poultry Farm in Demerara.

The Demerara *Argosy* of May 30, states that a considerable amount of interest is being shown in the Board of Agriculture's 'poultry farm' at the Botanic Gardens. The Board imported, in January last, 12 hens and 2 cocks of the Plymouth Rock variety, with a view to improving and extending the breed of poultry in the colony. Already a brood of a hundred chickens has been hatched, and it is expected that they will be disposed of throughout the colony at remunerative prices. There is a keen demand for eggs, which are being sold at the Botanic Gardens for 50c. per dozen. Of the fourteen fowls, originally imported, two died at the Orphan Asylum, whither the whole were sent on their arrival, and later, when at the Gardens, the remainder developed a type of chicken cholera, from which other four died. Every precaution was taken under the supervision of Mr. Raleigh, Government Veterinary Surgeon, to protect the fowls, and the disease was speedily stamped out. The birds at first suffered from change of both climate and diet. They are kept in a well ventilated, though not draughty, house, which is connected with a wire run for the chickens. In favourable weather, the hens are allowed their freedom in the open air during the greater part of each day. At night, they are driven into the house, where the larger birds roost, the hens with broods being provided with spacious coops.

CACAO IN PORTUGUESE AFRICA.

In a previous issue of this journal *(Agricultural News,* Vol. II, p. 135), we drew attention to the production of cacao in São Thomé and Principe. The following account of the export of cacao from Portuguese colonies in Africa, is a translation of an article by Herr F. Moller, entitled 'Kakao export der portugiesisch afrikanischen Kolonien,' which appeared in *Der Tropenpflanzer* for March 1903:—

In the years 1896 to 1900, the following amounts were exported :—

From São Thomé and Principe :—		
To Germany	386,484	cwt.
,, England	339,537	,,
,, Holland	88,144	,,
,, Belgium	49,319	,,
,, France	46,424	,,
,, Italy	15,000	,,
,, United States of America ...	8,666	,,
,, Spain	6,485	,,
,, Austria	4,671	,,
,, Russia	2,698	,,
,, Denmark	244	,,
,, Sweden and Norway ...	225	,,
,, Portugal	7,424	,,
From Angola :—		
To Germany	1,449	,,
,, England	367	,,
,, Spain	121	,,
,, France	98	,,
,, Holland	32	,,
,, Portugal	141	,,
From Cabo Verde :—		
To England	12	,,
From Mozambique :—		
To Portugal	1·2	,,

The greater part of the cacao of Angola comes from Cabinda, the greater part of that of Cabo Verde from the island of São Thiago.

Most of the cacao from Portuguese possessions proceeds direct in Portuguese ships to Lisbon, whence it is distributed to the various foreign countries. The direct export from Portuguese colonies to foreign lands is very small. During the years 1896 to 1900, Portugal imported from abroad 123 cwt. of cacao, and 2,998 cwt. of chocolate and prepared cacao in the form of powder; on the other hand, Portugal imported from its possessions 14 cwt. of chocolate and cacao in the form of powder.

In Lisbon and Oporto there are chocolate manufactories, but the product is not equal to the good chocolate from Switzerland, Spain, etc. There is a factory in Lisbon for the preparation of cacao in the form of powder and its product is of high quality.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—June 9, 1903.—Messrs. Kearton Piper & Co., Messrs. E. A. De Pass & Co., June 9, 1903, 'The Gardeners' Chronicle,' and 'The Public Ledger,' June 6, 1903.

Aloes—Curaçoa, 14/6 to 30/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 1⅞*d.* to 4½*d.* per ℔.
Bees-wax—£8 to £8 10*s.* per cwt.
Cacao—T'dad, 57/- to 65/- per cwt.; Jamaica, 49/- to 57/- per cwt.; Grenada, 54/- to 59/- per cwt.; Dominica, 52/- to 58/- per cwt.
Cardamoms—Mysore, 1/4 to 3/4 per ℔.
Coffee—Jamaica, 30/6 to 105/- per cwt.
Cotton—West Indian, 6*d.* to 6¼*d.* per ℔.
Fruit—
  Bananas—6/- to 7/6 per bunch.
  Oranges—No quotations.
  Pines—Jamaicas, 3*d.* to 1*s.* 3*d.* each; Antiguas, 12/- to 20/- per barrel.
Fustic—Dull.
Ginger—41/- to 68/- per cwt.
Honey—Jamaica, 17/- to 24/6 per cwt.
Isinglass—West Indian, 1/4 to 2/8 per ℔.
Kola Nuts—1*d.* to 4*d.* per ℔.
Lime Juice—Raw, 1*s.* to 1*s.* 2*d.* per gallon. Concentrated, £15 per pipe.
Logwood—No quotations.
Mace—1/9 to 2/5 per ℔.
Nitrate of Soda—Agricultural, £9 7*s.* 6*d.* to £9 10*s.* 0*d.* per ton.
Nutmegs—70's to 75's, 1/6 to 1/9; 80's to 90's, 1/2 to 1/4 per ℔.
Pimento—2½*d.* to 2¾*d.* per ℔.
Rum—Demerara, 8½*d.* to 10*d.* per proof gallon. Jamaica, 1/6 to 8/- per proof gallon.
Sugar—Muscovado, 11/3 to 12/6; Crystallized, 14/- to 16/3 per cwt.
Sulphate of Ammonia—£12 15*s.* to £12 17*s.* 6*d.* per ton.
Tamarinds—Barbados, 11/- to 11/6 per cwt.; Antiguas, 8/- to 9/6 per cwt.

New York,—June 12, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, $1·30 to $1·35; eight hands, $1·00; seven hands, 70c. per bunch.
Cacao—African, 12c. to 12½c.; Caracas, 12½c. to 13⅜c.; Jamaica, 10½c. to 11⅝c.; Grenada, 12c. to 12¼c.; Trinidad, 12¾c. to 13¼c. per ℔.
Cocoa-nuts—Trinidads, $17·00 to $18·00; Jamaicas, $19·00 to $21·00 per M.
Coffee—Jamaica, ordinary to good ordinary, 5½c. to 6c. per ℔.; Manchester grades, 8c. to 10½c. per ℔.
Ginger—Jamaica, 7½c. to 8¼c. per ℔.
Pimento—5c. per ℔.
Rubber—Nicaragua scrap, 67½c. to 68c. per ℔.; Guayaquil strip, 61c. to 62c.
Sugar—Muscovado, 89°, 3⅛c per ℔.; Centrifugals, 96°, 3 19/32c.; Molasses, 89°, 2 29/32c. per ℔.

INTER-COLONIAL MARKETS.

Antigua,—June 17, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—21c. to 22c. per gallon, package included.
Sugar—$1·40 per 100 ℔.

Barbados,—June 20, 1903.—Messrs. T. S. Garraway & Co. and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·75 per 100 ℔.
Cacao—$12·11 per 100 ℔.
Coffee—Jamaica and ordinary Rio, $8·00 to $8·50 per 100 ℔.
Hay—New Brunswick, 85c. per 100 ℔.
Manures—Nitrate of Soda $60·00; Ohlendorff's Dissolved Guano $60·00; Sulphate of Ammonia $80·00; Sulphate of Potash $67·00 per ton.
Molasses—18c. per gallon, and $4·00 for puncheon.
Onions—Madeira, $3·50 per 100 ℔.
Potatos, English—$2·00 to $3·50 per 100 ℔.
Rice—Ballam, $4·60 per bag (190 ℔.); Patna, $3·50 per 100 ℔.; Rangoon, $2·75 per 100 ℔.
Sugar—In hogsheads, $1·25 per 100 ℔., and $5·00 for hhd. In bags, $1·50 per 100 ℔.

British Guiana,—June 18, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $9·00 to $9·50 per barrel.
Cacao—Native, 11c. to 12c. per ℔.
Cassava Starch—$8·00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 11c. to 11½c. per ℔. (retail).
  —Creole, 11c. to 12c. per ℔.
Dhal—$3·30 to $3·40 per bag of 168 ℔.
Eddoes—$1·44 per barrel.
Molasses—Vacuum Pan, yellow, 16c. per gallon, casks included.
Onions—2¼c. to 2½c. per ℔.
Pea Nuts—Curaçoa, 3¾c.; American, 5c. per ℔. (retail).
Pigs—Young Boars and Sows, $5·00 each.
Plantains—24c. to 40c. per bunch.
Potatos, English—$3·00 to $3·50 per barrel.
Rice—Ballam, $4·70 to $4·75 ex store; Patna and Seeta, $5·60 to $5·75 per bag.
  Creole Rice, 20c. per gallon (retail).
Sweet Potatos—Barbados, $1·20 per barrel.
Tannias—$1·92 per bag.
Yams—$2·16 per bag.
Sugar—Dark Crystals, $1·80 to $1·88; Yellow, $2·25 to $2·40; Molasses, $1·80 to $1·90 per 100 ℔.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—June 18, 1903.—Messrs. Gordon Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Very little doing.
Cacao—Ordinary, $11·75 to $12·25; Estates, $12·50 to $12·75 per fanega.
Coffee—6c. to 6½c. per ℔.
Onions—$1·25 to $1·30 per 100 ℔.
Potatos, English—$1·40 to $1·50 per 100 ℔.
Rice—Yellow, $4·20 to $4·40; White Table, $5·40 to $6·00 per bag.
Sugar—White Crystals $3·40; Yellow Crystals for local consumption, $2·25 per 100 ℔.
  —Molasses sugar, $1·80 to $2·00 per 100 ℔.

THE BEST MANURES FOR COLONIAL USE

ARE

Ohlendorff's Dissolved Peruvian Guano—For Sugar-cane and general use.

Ohlendorff's Special Sugar-cane Manure

Ohlendorff's Special Cocoa Manure

Sulphate of Ammonia, Nitrate of Soda, Superphosphates, high grades, Potash Salts, Basic Slag and all other high-class Fertilizers.

APPLY TO LOCAL AGENTS OR DIRECT TO

THE ANGLO-CONTINENTAL (LATE OHLENDORFF'S) GUANO WORKS,

London Agency, 15, Leadenhall Street, London E.C.,
Barbados Agents: Messrs. James A. Lynch & Co., Bridgetown.

[33.]

"CACAO."

BY

J. H. HART, F.L.S.

NEW EDITION.

A TREATISE ON THE CULTIVATION, CURING AND CHEMISTRY OF

COMMERCIAL CACAO.

DAVIDSON & TODD, Trinidad.
Wm. WESLEY & Co., 28, Essex St., London.

Price 3s. per copy.

[50.]

NEW SEEDLING CANE.

(COLLYNNS SEEDLING).

Present supply of plants exhausted. Orders now booked for 'Top' and 'Cane' plants for delivery next November. 50 cents per 100.

Analysis of Juice by Professor d'Albuquerque:—

	Stable Field.	*Lymphs Field.*
Specific gravity	1·0853	1·0848
Saccharose ℔. per gallon ...	2·091	2·106
Glucose ℔. per gallon ...	·048	·042
Solids not Sugar	·184	·163
Quotient of Purity... ...	90·01	91·13
Glucose ratio	2·29	1·99

RESULTS OBTAINED ON ESTATE.

30 clumps weighed 1,610 ℔.
Equal to, per acre, (5x5) 41·75 tons.

30 clumps gave 112 gallons juice.
Equal to, per acre, (5x5) 6,500 gallons.

Very Strong, Large Grain Sugar obtained in Boiling House.

The Cane possesses a very hard rind and parts readily with its dry leaves.

Germinates Freely:
Ratoons Vigorously.

Apply to

C. K. GIBBONS,
Collynns, St. Lucy,
Barbados.

[33.]

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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Cotton Cultivation.

CONSIDERABLE progress has been made, during the last few months, in advancing the prospects of cotton cultivation in the West Indies. The subject has been widely discussed, and, from the action taken, it is probable that several thousand acres will be planted with the best varieties of cotton suited to these colonies, during the current year. A gratifying feature in connexion with the present efforts to establish cotton cultivation in the West Indies is the valuable assistance afforded by the British Cotton Growing Association. It is not too much to say that the generous support, granted by the Association, has largely contributed to rouse the interest of planters and induced them to realize that the establishment of an auxiliary industry, like cotton, is almost essential to the continued existence of the sugar industry.

The present prices obtained for sugar hardly pay the cost of cultivation and, in view of the large sowings of beet in Europe and the anticipated increase of the Cuban and other crops, it is not unlikely that the price of muscovado sugar will continue low for some time. Moreover, it should be remembered that in Barbados, at all events, root fungus is again prevalent, and there is more need than ever to have a remunerative crop like cotton to grow in rotation to the sugar-cane, and so get rid of the disease by a natural process of exhaustion. Neither maize nor sorghum will answer the purpose, as they are too closely related to the sugar-cane. Sweet potatos are, already, grown to so large an extent that they are practically unsaleable. So far, therefore, from tending to restrict the area under sugar-cane, cotton cultivation should be regarded as a valuable means of renewing the energies of exhausted sugar lands and keeping them free from disease.

From returns recently to hand it is not improbable that about 4,000 acres will be placed under cotton in the Windward and Leeward Islands and Barbados during the present planting season.

The Imperial Department of Agriculture has, from the first, assisted the planters in obtaining supplies of the best cotton seed, in most instances, free of cost. It has, also, taken an active part, in conjunction with the several Governments, in proposals for erecting Central Factories for ginning and baling cotton and enabling the planters to realize the value of their crops as soon as possible. The first of these Central Factories will shortly be completed at Barbados, another is in course of being provided at Antigua, and a third is under consideration at St. Vincent.

It should be remembered that to obtain the best results from cotton, as indeed from any cultivation in these days, it is necessary to choose suitable land and maintain it in a high state of cultivation. No other crop should be planted with cotton. As the plants grow up, close attention should be given to the appearance of insect and fungoid pests. These require to be dealt with immediately or the crop may be reduced to one-half or even lost altogether. The local officers of the Imperial Department of Agriculture are prepared to advise and assist in the treatment of diseases and, if taken in time, the loss due to this cause need not seriously affect the crop.

As is well known, the present prices of cotton are exceptionally high. Some samples of Sea Island cotton grown at Barbados were lately valued at one shilling per pound. A sample of Sea Island cotton grown at Montserrat was valued as high as one shilling and two pence per pound. It is unlikely that these prices will continue.

In an address delivered by the Imperial Commissioner of Agriculture at Antigua on June 29, he stated that 'a careful estimate had been formed of the probable cost of establishing cotton in Antigua, and it was understood that about £4 per acre would cover all expenses up to the time of picking the cotton. Other expenses might be placed at 15*s.*, making a total of £4 15*s.* per acre. The crop would probably reach not less than 300 lb. of lint per acre, and this, at the low valuation of 7*d.* per lb. (for good Sea Island cotton), would realize £8 15*s.*, leaving, without taking account of the value of the seed, a net profit of £4 per acre, earned within about eight months from the time of planting. There would, also, be a ratoon crop to be reaped soon after.'

The more promising portions of the West Indies for cotton-growing are the Grenadines, St. Vincent, Barbados, the southern portions of St. Lucia, Montserrat, the south-eastern parts of Antigua, Nevis, St. Kitt's, and the Virgin Islands.

If only the planters in these localities would heartily take up cotton-growing, select exactly the right conditions, cultivate the plants with care and judgement and keep, from the first, a watchful eye for insect and fungoid pests, there are good grounds for believing that the results would be distinctly satisfactory. As heretofore, the latest information in regard to the position and prospects of cotton-growing in the West Indies will be published in this journal, and every reasonable facility will be afforded by the officers of the Imperial Department of Agriculture to promote the success of the industry.

SUGAR INDUSTRY.

Nevis.

The following proposals, in reference to an additional Imperial grant of £1,000 in aid of peasant cultivation in the island of Nevis, are published in continuation of somewhat similar proposals, made at Antigua (see *Agricultural News:* Vol. II, pp. 99, 131 and 210):—

1. For every £100 ready money paid to Muscovado Mill Owners by the Government before August 31 next, the following consideration is to be given by the Mill Owner:—

(a) The Mill Owner will, up to 240 tons of sugar-cane in any one year, for six years, if tendered, pay the peasant, for each ton delivered at the mill, cash at the end of each week, according to the sliding scale here under.

(b) If more than 240 tons of cane be tendered by the peasants in one year, the Mill Owner may accept and pay for the excess on the sliding scale, but the obligation of the Mill Owner will cease altogether as soon as he has paid, on the sliding scale, in the proportion of 1,200 tons for every £100 of the original grant, or at the expiration of six years. No one grant shall exceed £500.

2. The Mill Owner is to give a bond with sureties to the satisfaction of the Governor that he will, on any breach of this agreement during six years, pay, in place of liquidated damages, such penalties as the Governor may adjudge, not exceeding the amount originally received in cash from the Governor.

3. Preference will be given by having regard to the locality, the security and the undertaking to provide forthwith a suitable platform weighing machine.

4. Tenders are to be sent to the Administrator of St. Kitt's-Nevis by noon, Tuesday, June 2; naming the sureties proposed and the amount desired to be taken up in each case. Tenders on behalf of parties in England will be open to withdrawal or confirmation till July 10.

SLIDING SCALE.

Scale of prices to be paid per ton of peasants' canes calculated on the net local value of muscovado in Nevis :—

	NET LOCAL VALUE OF 100 lb. OF MUSCOVADO. $ c.		PRICE TO BE PAID FOR CANE PER TON. $ c.	s. d.	
From	1·30	and under to	1·39	... 6 0 (min.)	inclusive.
,,	1·40	,, ,, ,,	1·49	... 6 4	,, ,,
,,	1·50	,, ,, ,,	1·59	... 6 8	,, ,,
,,	1·60	,, ,, ,,	1·69	... 7 0	,, ,,
,,	1·70	,, ,, ,,	1·79	... 7 4	,, ,,
,,	1·80	,, ,, ,,	1·89	... 7 8	,, ,,
,,	1·90	,, ,, ,,	1·99	... 8 0	,, ,,
,,	2·00	,, ,, ,,	2·09	... 8 4	,, ,,
,,	2·10	,, ,, ,,	2·19	... 8 8	,, ,,
,,	2·20	,, ,, ,,	2·29	... 9 0	,, ,,

and so on adding 4*d.* per ton of cane for each increase of 10 cents per 100 lb. in local value of sugar. The value caused to be published by the Administrator every Friday at the Police Stations in Nevis, is to be the value accepted by all concerned.

Sugar-cane in Java in 1902.

The following notes, on the sugar-cane crop of Java, are taken from the *Report on the Trade and Commerce of Java for the year 1902*, by Mr. Consul Fraser (Foreign Office: Diplomatic and Consular Reports, May 1903):—

The year under review has been anything but a prosperous one. The prices realized for the great staple of the island, sugar, were the lowest ever recorded, and although the crop was a heavy one, the largest so far produced, this fact did not compensate for the unremunerative values.

The weather during the past season was generally much more favourable for sugar planting purposes and for the growth of the cane than in either of the two preceding years. On some estates, in the eastern districts of the island, where, owing to the nature of the ground, the water was unable to penetrate, the rains which fell during the planting season in 1901 had an unfavourable influence on the production, as planting had to be done on ground which had not been sufficiently exposed; while the dry monsoon in 1902 commenced so exceptionally early that on many estates, where the ground held insufficient moisture, the cane quickly dried up, to the detriment of the percentage of sugar. The area planted was slightly larger than in 1901, and the production, on the whole, may be taken as favourable. The total crop amounted to the record one of 848,263 tons, as compared with the previous highest of 766,238 tons in 1901.

With reference to cane diseases, Mr. Vice-Consul McLean reports as follows:—

'There was less injury experienced from root disease, owing to heavier manuring with sulphate of ammonia, and the discovery of new varieties of cane which are proof against this sickness.

'The growing of cane from seed and from crossing has considerably increased, as the varieties produced, besides combining a large cane production with a high sugar percentage, appear to better withstand the cane diseases.

'The "sereh" has thus met with a check, but, without special measures in the cultivation of the plant, this disease will continue to show its prejudicial effects.'

The following table gives the exports of sugar for the year ended December 1902, compared with the years 1900 and 1901. It will be noticed that the United States and China are the chief importers of Java sugar: very little is exported to Europe:—

Country	Quantity		
	1900.	1901.	1902.
	Tons.	Tons.	Tons.
Europe	6,585	——	1,631
United States	419,808	292,169	405,368
Australia	72,990	83,099	71,717
China	113,474	148,603	134,033
Japan	31,559	36,694	47,458
Other countries	34,690	48,481	51,190
Total	679,106	609,046	711,397

TABASCO PEPPER AND TABASCO ALLSPICE.

Tabasco pepper is a condiment much used in the United States and is reported to be one of the hottest known. It is said to be made from Capsicum, with, possibly, some other ingredients.

In *Pharmacographia* (2nd. edition, p. 289), the following was noted:— 'The Mexican spice called 'Pimienta de Tabasco' (*Piment Tabago*, Guibourt) is somewhat larger and less aromatic than Jamaica allspice.' It was, at first, thought that *Piment Tabago*, might be a mis-print for *Pimenta Tabago*, but this was not to be found in the *Index Kewensis.*

Inquiry, as to these two products, was made of the Director, Royal Botanic Gardens, Kew, and the following information was received:—

1. Tabasco pepper sauce or liquid pepper is said to be the pulp of the ripe fruit of the Tabasco variety [of *Capsicum annuum*], extracted by pressure and so handled as to retain all flavour, strength, aroma and colour of the ripe fruit. (Missouri Botanic Garden, *Ninth Report*, 1898, p. 59.)

2. 'Pimienta de Tabasco' is the Mexican name for *Pimenta officinalis*, var. *cumarensis*, which was originally described as a distinct species, *Myrtus Tabasco*, and may be called Tabasco allspice.

There seems to be no reason for supposing that the Tabasco allspice enters into the preparation of Tabasco pepper.

ARBOR DAY.

Grenada.

The following account of the celebration of Arbor Day in Grenada (*Agricultural News*: Vol. II, p. 181), is taken from the *Federalist* of June 25:—

A large number of persons visited the Botanic Garden on June 24, for the purpose of obtaining plants, which were distributed free of charge to all who applied for them. Besides this, other private individuals marked the advent of the day by planting, in their little plots, some ornamental shrub or useful plant. This is the first occasion, in our experience, on which Arbor Day was so universally recognized in this colony, and this zeal is chiefly due to the initiative of the Agricultural Society.

WEST INDIAN FRUIT.

BARBADOS BANANAS.

In previous numbers of the *Agricultural News* (Vol. I, pp. 68 and 134; Vol. II, p. 215) mention was made of the successful experimental shipments of bananas from Barbados to England by the Imperial Department of Agriculture, and attention was directed to the possibility of developing a regular banana trade between Barbados and the mother country. In connexion with the subject, we to-day reproduce the following extracts from 'Notes on Bananas' by Mr. F. Pink, of Messrs. Pink & Sons, Plymouth, touching the prospects of Barbados as a banana growing country, which should afford encouragement to persons desirous of embarking in banana cultivation in that island:—

BARBADOS AS A BANANA GROWING COUNTRY.

At present, it appears that Barbados is more favourably situated than any other part of the world for supplying the British markets, for the following reasons:—

Its fruit is superior to that from the Canary Islands and Madeira, moreover, these islands are already exporting as many bananas as they can grow, and are therefore not very formidable competitors.

With the exception of Trinidad, it is 1,000 miles nearer to England than any banana growing country in the western hemisphere, which is likely to export bananas to England.

MEANS OF EXPORTING BANANAS.

At present, the only means of exporting bananas from Barbados is by the fortnightly steamers of the Royal Mail Steamship Company. These vessels are not specially fitted for carrying fruit, but hopes are entertained that they will soon be fitted with special appliances. The experimental shipments already made from Barbados have proved that special cooling machinery is not necessary, but, if it were in use, the risks of shipping would be very much reduced, and it would also be possible to ship the fruit in a more mature condition. In any case, the exports from the island will be limited by the carrying capacity of these steamers.

THE KIND OF FRUIT TO EXPORT.

At present, red or claret coloured bananas are rare here, and sell at high prices. For ordinary trade purposes, however, the Chinese or dwarf banana can be relied upon to sell at good prices, as it is always required by the best shops. The large, coarse banana of Costa Rica and Jamaica is likely to continue to meet with the best demand by the working class population. This fruit, not being packed in crates, can always be sold at a much lower price than other kinds.

Every endeavour should be made to grow large symmetrical bunches, with large fingers clustered closely round the stem. The freight, and other expenses of shipment, are no more for the largest than for the smallest bunches.

FREIGHT.

The freight from Barbados to Plymouth or Southampton is 2*s.* per crate. As soon as considerable quantities of fruit can be sent, it will be possible to arrange to land it with less expense than at present, and the landing dues will probably not exceed 3*d.* per bunch at either port. It may be mentioned that the freight from Jamaica is about 2*s.* 3*d.* per bunch, from Madeira about 2*s.*, and from the Canary Islands from 1*s.* 3*d.* to 1*s.* 9*d.*

HINTS ON PACKING AND SHIPPING BANANAS.

The following hints on packing bananas at Barbados, for shipment to England, are contributed by Mr. J. R. Bovell, F.L.S., F.C.S., Superintendent of the Botanic Station. These notes will supplement Mr. F. Pink's account of 'Barbados Bananas' published in the present issue:—

WHEN TO CUT.

Bunches of bananas, intended for shipment to England, should be cut about fifteen days before they would be ripe. At this stage, the bananas are still slightly angular and of a green colour. In cutting off the small end of the banana spike, care should be taken to leave not less than 4 inches beyond the last 'hand' of the spike: this is for hanging the bunch when it reaches the fruiterer's shop. The end should be removed many weeks before the bunch is cut, so that the cut surface may heal, and that no decay, which may occur at the end, may reach the last 'hand.'

The bunches should be cut and packed on the Thursday preceding the Saturday on which the mail steamer is scheduled to leave Barbados for England. On the Friday they should be sent to Messrs. Gardiner Austin's store, Pier Head, Bridgetown, between 10 a.m. and 4 p.m.

PACKING.

Great care should be taken that the bananas have not the slighest bruise. Bunches containing bruised fruit, however slight the bruises may be, should not be shipped.

Each bunch should first be wrapped in cotton wool and then in paper. Strings of 'shag' (the sheath of the banana leaf) should be lightly wrapped around the sheets of paper to keep them in position while the bunch is being put into the crate. Having wrapped the bunch of bananas, put into a crate, on which only half the slats have been nailed, a sufficient quantity of dried banana leaves (the blades or thin portions of the leaf on each side of the midrib) to form a bed 1½ inches thick when pressed by the weight of the bunch. This will protect the under side of the bunch from coming into contact with the crate.

Place the bunch of bananas in the crate and gradually stuff the dried banana leaves around it, until sufficient have been put in to prevent the paper unwrapping. Now cut the 'shag' string and draw it out, and continue the packing until the bunch is firmly fixed in the crate. The remainder of the slats are to be nailed on as they are needed to keep the packing in its place.

MARKING.

Each crate should have the shipper's initials and the initials of the estate clearly stencilled on one end, and its own number in the consignment. On the centre piece, of the same end, there should also be one or more 'x's stencilled to indicate the quality of the fruit. A bunch weighing, when in the crate, from 40 to 49 ℔. (gross) should have 'x'; a bunch weighing 50 to 59 ℔. 'xx'; one weighing 60 to 69 ℔. 'xxx'; one weighing 70 to 79 ℔. 'xxxx'; and so on up to 100 ℔. or more. As the crates are stored standing on the stem or thick end of the bunch, it is necessary, for the marks to be clearly seen, that they be placed on the end of the crate containing the flower or small end of the bunch. When the bunch of bananas, ready packed, will weigh less than 60 ℔., two bunches should be packed in one crate, side by side; in this case, the cross pieces of the ends of the crate are made longer and about two to three slats more are required on each side. When two bunches are put in one crate, the figure '2' is to be placed after the 'x's. Thus, a crate with two bunches weighing 75 ℔., when ready packed, should be marked on the cross piece 'xxxx 2'. Bunches which will weigh more than 60 ℔. when packed must be shipped by themselves. The address of the consignee should be mark on the slats at the side of the crate.

EXPENSES.

In addition to the freight and lighterage, a local charge of 5 per cent. is made for the purpose of paying the expenses incurred in receiving the bananas, shipping them, receiving and distributing the money, etc.

SALTPETRE FROM AIR.

According to *Indian Planting and Gardening* of May 30, the United States Consul-General at Frankfort, states that Professor Muthmann, of the Polytechnical Academy at Munich, in a recent lecture, stated that he had demonstrated that saltpetere (potassium nitrate) can be produced from air, by electricity, at less than one-fourth its present cost. It has long been known to scientists, that nitric acid can be formed by passing high electric currents through moist air between two platinum poles, and suitable apparatus is all that is now needed for the manufacture of nitrates on a large scale. Commenting on this, Professor J. P. d'Albuquerque writes :—'I should say that the above is the direction in which the future manufacture of nitrates may be greatly extended and cheapened.'

Treatment of Colic. Colic in horses can nearly always be prevented by feeding good food regularly and not too much of it. Always water before feeding grain. Treatment: Give two ounces each of tincture of opium and sweet spirits of nitre, at a dose, in one half-pint of cold water and repeat in one hour, if not relieved. (*American Agriculturist.* June 6, 1903.)

WEST INDIAN PRODUCTS.

Notes on Essential Oils.

The following notes are taken from Messrs. Schimmel & Co's. *Semi-Annual Report,* in continuation of those given on page 20 of this volume of the *Agricultural News:*—

The value of lemon grass oil has undergone considerable fluctuations. The lowest point was reached in November, at 4*d.* per oz., whilst at the present time it cannot be bought below 5¼*d.*

The export from Cochin amounted, in 1902, to only 2,350 cases but, on the other hand, fresh sources of supply have appeared, which in the near future may possibly make competition to the present monopoly.

To all appearances, the cultivation of *Andropogon* grasses in the West Indies, to which we referred in our last October report, is extending. We have lately received two further samples of Andropogon oils from the Government laboratory in Jamaica. On one of these oils we have already reported under the heading 'citronella oil'; the other one was, like the previous one from Antigua, designated as having been obtained from *Andropogon Schoenanthus,* but it has such a pronounced odour of lemon grass oil, that we have no hesitation in calling it by that name. It compares favourably with the Antigua oil by its considerably higher aldehyde-content (83·5 per cent. against 48·2 per cent. for the other), but it shares with the latter its insolubility in 70 and 80 per cent. alcohol; 90 per cent. and absolute alcohol form at first a clear solution, but when more is added, they cause strong turbidity. In its physical constants the oil does not show any specially great differences from those observed at other times.

West Indian Products in New York.

The following extracts, dealing with products in which West Indian agriculturists are interested, are taken from the *Report on the Trade of the Consular District of New York for 1902,* by Consul-General Sir Percy Sanderson, K.C.M.G. (Foreign Office: May 1903):—

There has been a fair increase in the importation of cacao as compared with 1901, which is more marked if the comparison be made with the average of five years up to that year. There is a large importation from the British West Indies, which seems to be increasing of late years.

The imports of India rubber show a considerable decrease; but British imports increased slightly; those from Brazil, whence the chief supply is derived, diminished, as did also imports from Germany.

The average price of cotton was lower in 1902 than in either of the two previous years. The value of the exports of the raw material shows a reduction of about 18 per cent. as compared with 1901, but on the average of five years there is little difference.

The Vice-Consul at Providence reports that a direct line of steamers in the fruit trade has been established between that port and the British West Indies, the trade being carried on at first by British ships, but latterly by vessels under the Russian and Norwegian flag.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 175 of this volume.

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Agricultural News

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NOTES AND COMMENTS.

Crops in Demerara.

According to the Demerara *Argosy* of July 1, about 3,200 tons of sugar were sold for exportation during the fortnight, including 1,000 tons on Monday, at rates between $1·80 and $1·82 per 100lb. Telegrams, since received, show a further decline in the United States, now placing the parity at about $1·75 in Demerara. The labour supply is still scarce. Mid-summer grinding has now generally come to a close, and there remains very little produce for sale. The rains, which have adversely affected cultivation, were not so heavy lately, and there is ground for the hope that good weather will now be experienced.

Sales of dark crystals for home consumption have been made at $1·90 to $2; Molasses sugar, $1·75 to $2. There is some inquiry for first yellow molasses, but none is to be had. Rum, coloured, 20 to 21 cents per gallon, and white, 22 to 24 cents.

Telegrams received from New York, since the joining of the cable, report another rise of 20 cents per barrel in 'Trust' brands of flour. It is fortunate, under the circumstances, that the Calcutta rice market is not so stiff, as, owing to the heavy floods, the local crop is more or less damaged. With higher rates for flour a keen demand will no doubt follow for imported rice.

Castor Oil in St. Lucia.

Mr. George S. Hudson, the Agricultural Instructor at St. Lucia, states that about 6 cwt. of castor oil seed has been obtained from a plot of ½ acre in eighteen months. He states that cleaning the seed is a great obstacle to its preparation for market, unless hand picking is resorted to, as in India. The weight of the husks (of the large seeded variety) prevents them from being easily separated in a winnower, and, unless some economical mechanical means can be found to clean the seed effectually, he is of opinion that the cultivation of castor oil can never be a commercial success in the West Indies.

Ginger in Jamaica.

According to the Annual Report, published in the *Journal of the Jamaica Agricultural Society* for June 1903, prices for ginger have been low, through perhaps two causes: (1) The competition of a better prepared product from Cochin-China, now marketed in large quantities; (2) the want of virgin soil, and the planting of old lands not properly prepared for the crop.

The remedies are: (1) Fallowing, manuring, and deep, clean cultivation; (2) more care in peeling and curing.

The opportunity still awaits some inventor to produce a peeling or brushing machine that will skin the ginger thinly and evenly. The exports increased from 22,482 cwt. to 27,283 cwt. No first-class exhibits of ginger were made at shows.

The Uses of the Sunflower.

In a previous issue of the *Agricultural News* (Vol. II, p. 184), we drew attention to the possibilities of sunflower cultivation. A bulletin (No. 60), published by the Division of Chemistry (United States Department of Agriculture), gives some further information on this point.

It is stated that the same kind of soil, the same cultivation and the same manuring as are necessary for Indian corn will suit the sunflower. The seeds should be planted, 2 to 3 inches apart, in rows 3 to 3½ feet apart, at a depth, except in very heavy soils, of 2 to 3 inches. The heads should be harvested before the seeds are quite ripe, to prevent shattering and loss. After drying, the seeds can be threshed out and stored in bags in the usual way.

The most useful part of the plant is the seed. The seeds themselves form an excellent food for poultry and are fed to horses and cattle to keep the animals in good physical condition. The oil expressed from the seeds is the most valuable manufactured product of the sunflower, and for edible purposes approaches more nearly to olive oil than any other vegetable oil known. The cake, left after the extraction of the oil is rich in nitrogenous matter, its food value is equal to that of the cake made from linseed or Indian corn, at the same time it has the advantage of being more palatable. The branches and stalks of the sunflower are used as food for cattle, horses and sheep.

The Cocoa-nut in Trinidad.

An article in the *Journal d'Agriculture Tropicale* for March 1903, by Mr. D. A. Magani, gives an account of the method of opening the cocoa-nut in Trinidad. The cocoa-nut is opened, generally, by a negro with four blows of a cutlass. The nut, broken into three pieces, is handed over to a woman or boy who removes the kernel with a small knife and puts it, cut in small pieces, into a bag. The bag when full is carried to the drying room.

A thousand nuts yield about 650 to 700 ℔. of kernel and fresh fibre (undried). The cost of breaking the nuts, up to the time they are cut up and put into the bag, amounts to about 2½ francs (about 2*s.*) per thousand nuts. A good labourer breaks about 2,000 nuts per day.

The writer states that the growers would be grateful if manufacturers could supply them with a machine that would break the nuts and remove the kernels. The editor, in a note, states that he knows of only one machine, of German make, for breaking the nuts, and that is of a very primitive type.

Balata.

An article in *Der Tropenpflanzer* for May 1903, gives some figures regarding the export of balata from Venezuela in 1902. The total export for the year amounted to 816,752 kg. (=16,335 cwt.); of this, 12,375 cwt. were exported before the end of May; from this time up to December 15, the exports ceased on account of the blockade. In the present year, 3,723 cwt. were exported in January, 5,516 cwt. in February, and 1,322 cwt. up to March 13.

With reference to the note on 'Balata in Brazil,' translated from an article in *Der Tropenpflanzer (Agricultural News,* Vol. II, p. 149), the Director of the Royal Gardens, Kew, has written the Commissioner of Agriculture saying that 'there is no evidence that the Bullet tree which produces balata grows in the Amazon basin. There are species of *Mimusops* there, but nothing is known, certainly, as to their producing a gutta of commercial value.'

Spraying in Dominica.

We publish, in this issue (p. 232), extracts from Mr. Ballou's report on his visit to Dominica. It will be noticed that Mr. Ballou strongly recommends spraying the lime trees, in order to keep the scale insects in check. In this connexion, some notes on the spraying apparatus that has been tried in Dominica, supplied by Mr. J. Jones, the Curator of the Botanic Station, are of interest.

Mr. Jones says that, for large estates, the Merryweather steam sprayer (*Agricultural News*: Vol. I, p. 249; Vol II, p. 182) is undoubtedly the best machine for the purpose, capable, as it is, of working 2,000 feet of hose with eighteen double Vermorel nozzles. For smaller estates Mr. Jones recommends the 'Pomona' outfit, mounted on one of Henderson's water barrel trucks, with 3½ inch tyres. This pump is capable, on fairly level ground, of working 500 feet of ½ inch hose and three or four double Vermorel nozzles. On steep slopes and for smaller cultivations, Mr. Jones states that both the 'Success' knapsack sprayer and the 'Acme' pump are useful.

Mr. Jones emphasizes the importance of obtaining a sufficiency of hose, when ordering spraying outfits, and states that iron extension pipes, 8 feet long and fitted with stopcocks, are necessary. Three or four of the latter should be ordered with each 'Pomona' outfit, together with, at least, 250 to 300 feet of ½ inch hose. The Vermorel nozzle is the best yet tried in Dominica for use against scale insects. At least six of these should be ordered with each barrel pump. The 'Pomona' outfit should be fitted with a three-way stopcock; with this and a couple of plain three-ways, four separate lines of hose can be worked by one pump.

The Symington Fruit Scheme.

We have often, in the *Agricultural News,* drawn attention to this scheme and to the interest it has aroused both in England and the West Indies.

We learn from the Trinidad *Mirror* of July 2, that all arrangements for the working of the 'Symington West Indian Fruit Syndicate, Limited' are now completed. The directors of the new company are Mr. W. Weldon Symington (managing director), Mr. Kenny, a director of the Royal Mail Steam Packet Company, and Mr. James Epps. Among the chief capitalists are Messrs. Cadbury, Messrs. Fry, Messrs. Epps, and the Royal Mail Steam Packet Company.

It is stated that the Royal Mail ocean boats are to be fitted up with cold storage chambers, and that this has already been done with the R.M.S. *Tagus* and *Trent.* The latter boat is due to leave Trinidad on July 30, and will take 3,000 bunches of bananas, besides avocado pears and mangos.

It is to be hoped that West Indian agriculturists will, in their own interests, do their utmost to make the scheme a success, by taking all possible care in the cultivation and packing of their fruit.

Rubber in Ceylon.

In the report for 1902, Mr. J. B. Carruthers, the Acting-Director of the Royal Botanic Gardens, Ceylon, states that Para rubber is becoming one of the most important cultivations of that island. The tree has been planted at different elevations, but will prove most profitable at the lower ones. The prices obtained have kept very high. The Acting-Director urges the necessity for maintaining the Ceylon name in the London Market for the best quality of this rubber, and is strongly against the exportation of carelessly prepared or inferior rubber. He states that, both from the point of view of production and the probable future market prices, this should be one of the most valuable of the island's crops.

Some small areas of Castilloa rubber, planted at an elevation of 1,500 feet, show a vigorous growth. The trees are only two years old and the amount of latex they contain is stated to be encouraging.

INSECT NOTES.

Dominica.

The following extracts are taken from Mr. Ballou's report, after his visit to Dominica in April last:—

The planters and others had been alarmed over an outbreak of disease on the lime trees. This proved to be caused by scale insects and, though very serious, the amount of damage already done had been somewhat over estimated. Lime plantations, reported to be absolutely dead, were found to be leafless, and every tree had a large amount of dead wood in the branches; but the trees were alive and the buds, in many cases, already starting new growth. Other estates were not so badly affected and, in some instances, the attack was confined to single, isolated trees.

The Mussel Shell or Purple scale *(Mytilaspis citricola)* seemed to be responsible for the greater part of the damage, while in many instances the Orange Snow scale *(Chionaspis citri)* was abundant and was responsible for part of the damage. Several other scales were also found on the limes, but in comparatively small numbers. During my stay in the island, I was able to visit and inspect a large number of lime estates and found that the following general statements might be made:—

1. Very old trees, trees that have received little or no cultivation, trees that have received little or no manure, and trees that bore heavy crops last year, are badly attacked.

2. Very little spraying has been done in past years; on many estates, tillage has not been thorough; very little manure has been applied to the trees, and very little pruning has been done.

The following points should, therefore, be carefully attended to, if the planters wish to compete successfully with their rivals, in the future:—

1. Better cultural methods must be employed. These include tillage, manuring and pruning, which keep the tree in the most vigorous, healthy condition possible. Such a tree will be less liable to attack by scale insects.

2. Spraying must be employed as a means of keeping insects in check and preventing the outbreak of another general attack, such as the one under discussion. Now that the scales have become so numerous and so widely distributed in the island, some remedial measures are necessary and, so far as is known at present, spraying is the one best adapted to the conditions of lime culture in these islands, being effective, economical and practical.

Scale insects have a large number of insect enemies that do much towards keeping them in check, but they will not prevent an occasional, serious outbreak except in rare instances. Fungoid parasites were also observed in Dominica.

The insect enemies are several species of lady-birds. These were found very generally distributed and they have probably been largely instrumental in preventing general outbreaks in the past.

Two fungi were found on trees on several parts of the island. One of these is of a greyish appearance and can be seen growing among the scales. The other *(Sphaerostilbe coccophila)* is reddish in appearance. Both these are small and rather inconspicuous, but they can be seen, on careful examination, with the naked eye. The amount of harm done by these fungi to the scale insects is uncertain, but it is probably much more than is generally supposed.

On April 14, I addressed a meeting of the Dominica Agricultural Society on the subject of the scale insects on the lime trees, and at that time made the recommendations already given in this report. Several styles of spraying machines and the best insecticides to use were discussed. Following Mr. Lefroy, I strongly recommended rosin compound, which he had given extensive trial and found well adapted for use in the tropics, being easy of preparation, safe in application and effective against all the insects seriously affecting the limes in Dominica except, possibly, the Orange Snow scale. Whale oil soap and kerosene emulsion are both valuable in this connexion, but are much more expensive than rosin compound, and kerosene emulsion is liable not to be properly made, and consequently to burn and scorch the leaves.

The spraying apparatus at the Botanic Station consists of one barrel spray outfit and three knapsack sprayers. With the exception of one knapsack, the sprayers were all loaned to assist in the efforts that were being made to check the 'scale blight.'

The plants at the Botanic Station were carefully inspected. In the gardens, the trees and plants were quite free from insect pests, except a few lime trees which were infested with the Purple scale. They were apparently in perfect health, but examination showed the presence of the scale. These trees had been sprayed a short time before I examined them and probably most of the scales were then killed.

The seedling limes in the nursery were severely attacked by the Shield scale *(Lecanium hemisphaericum)* and I found the seedlings in the same condition at one of the estates I visited. This scale is not common on the older trees. In this connexion, I suggested the advisability of procuring a small tent or box for fumigation. Hydrocyanic acid gas is very commonly used for this purpose in the United States, but some experimenting will be necessary to learn exactly how it should be used in the tropics. I am of opinion that, if possible, it ought to be used on all nursery stock imported from other countries or sent from island to island.

I was unable to find specimens of the Banana weevil *(Sphenophorus sordidus)* and could learn but little of it on inquiry. I conclude that recently, at least, it has not been very destructive.

Thrips, on cacao, are not very prevalent, very little of their work having been seen; the planters evidently do not consider that they seriously damage their crops.

The Coffee Leaf Miner *(Cemiostomum coffeellum)* has practically put a stop to the culture of Arabian coffee, but does not attack Liberian. This latter, however, brings such a low price that, in most instances, the crops are not harvested.

The Lime Tree Bark Borer *(Leptostylus praemorsus)* is only occasionally found. Its presence can usually be detected by the exudation of gum at, or near, the surface of the ground, and it can be dug out with a knife before the tree is killed. Thoroughly white-washing the trunk will serve to prevent the entrance of the borer.

A Remedy for Malaria. The *Indian Review* for February 1903 states that Dr. L. Restrepo has reported through the British Legation, Bogota, Colombia, that he has found the husk of coffee beans useful in malarial fever. His prescription is: Coffee husk, 30 grams; water, 400 grams; boil for five minutes; strain; a small cup-full six times a day.

COTTON.

Cotton in German Africa.

The Germans, like the British, French and Russians, are trying to introduce cotton cultivation in their tropical colonies. The following notes, on this cultivation in German Africa, are taken from a *Report on the German Colonies for the year 1901-2*, by Mr. Buchanan, Secretary to His Majesty's Embassy at Berlin. Togoland is part of German West Africa; it borders, on its western frontier, the Gold Coast Colony:—

The conditions of the soil and climate in Togoland are, it is believed, favourable to the growth of cotton, and the natives, by whom it has long been cultivated in many parts of the country, have shown considerable readiness and intelligence as regards the adoption of American methods of cultivation. Experiment stations have been started at Tove and other places, under the supervision of American experts; and the cotton is brought down to Lome on mules and oxen, previously inoculated with Dr. Schilling's 'anti-Surra' serum, which has been found very efficacious as a preventive of that disease. Some 108,000 lb. of cotton grown, during the year 1901-2, from native (Togoland), American and Egyptian seed was shipped to Bremen, where, on examination by experts, that produced from native seed was pronounced as slightly superior to, and that from American seed slightly inferior to 'middling American.' The cotton raised from Egyptian seed came last in their estimation. Experiments are now being made to produce, by crossing, a variety combining the qualities of both the native and the American cotton plant.

The reports sent home, as to the existence of wild cotton in many parts of the districts between the coast of the East African Protectorate and the Great Lakes, induced the Colonial Economic Committee, in June 1901, to institute similar experiments in that colony. The delta of the Rufiji and the Kilwa district are said to offer the best promises of success, and experiments have already been made in the latter region with Egyptian, American and Indian seeds. The first of these three seeds appears to have furnished the best results, and the samples of cotton sent home have been classed by the Bremen Cotton Exchange as on a par with Egyptian cotton.

An expert has recently been sent from East Africa to study cotton-growing in the United States, and to select a staff of cotton planters to work under him on his return to the colony.

The Breeding of Cotton.

The value of plant breeding has often been insisted on in the *Agricultural News* (Vol. II, pp. 114, 134, etc). The following description of how to breed cotton is taken from a Bulletin, published by the Bureau of Plant Industry (United States Department of Agriculture), on *Distribution of Cotton Seed in 1903*, and shows how simple a matter plant breeding may be made:—

If it be desired to keep the variety up to its full productiveness and to make it better adapted to local conditions, the planter may easily accomplish this by following a simple and inexpensive method of selection. Before beginning the picking, go over the patch carefully and select and mark with a white cloth the best plants; that is, those most productive, earliest in ripening, and having the largest, best formed, and most numerous bolls. Care should also be exercised to select plants that are true to the type of the variety. Before each picking, send a careful man over the patch to pick the seed from the selected plants. Preserve such seed separately, gin it separately to avoid mixing, and use this to plant the crop the next year. If this simple method of selection be carried out each year, the yield will doubtless be greatly increased and as much or more added to the crop than would result from special fertilization or cultivation, though these factors should by no means be neglected. The importance of careful seed selection is seldom fully recognized, and growers are urged to give this factor of cotton culture more careful attention.

Fumigation of Cotton Seed.

The Mexican Cotton Boll Weevil, which is such a serious pest in a portion of the Southern United States, is not, at present, known to occur in the British West Indies, although Cuba is now supposed to be its original home. It is very difficult to deal with, on account of its method of feeding, protected by the bracts at the base of the young boll, and it will, eventually, probably infest the entire cotton growing area of the United States.

Large amounts of cotton seed are being imported from America, and though there is but a remote possibility of importing this weevil with the seed, yet the possibility is there. On this account, all cotton seed ought to be fumigated on arrival, as a matter of prevention.

This may be done with carbon bisulphide, which can generally be obtained of the druggist, one pound being sufficient to fumigate 25 to 30 bushels of seed. The seed should be put into a tight barrel or box and the carbon bisulphide poured into a shallow dish and placed on top of the seed, or, if the amount of the seed be small, the liquid may be poured directly upon the seed. The whole should be immediately covered as tightly as possible and left several hours (over-night). The vapour of carbon bisulphide is very inflammable and no lights should be allowed in the vicinity of the fumigation; it is also poisonous and should not be inhaled. With this precaution, which is very simple, the chances of importing this extremely undesirable insect are greatly reduced.

NOTES ON POULTRY KEEPING.

The following summary of some of the more important points in successful poultry keeping is taken from the *Southern Planter* of May 1903:—

1. Give your fowls a dry, comfortable, roomy house; crowded quarters are expensive.
2. Breed only from healthy, vigorous stock; never inbreed.
3. Feed a variety of wholesome food, but do not over feed.
4. Let your hens scratch for a part of their living; exercise is essential.
5. Be sure that they have grit of some kind; hens have no teeth.
6. Provide clean water for drinking; foul, stagnant water breeds disease.
7. Clean and disinfect your poultry houses and coops at least once a week; fowls have breathing organs.
8. Look out for lice; give them no quarters. Lice breeding and poultry breeding make an unprofitable combination.
9. Dampness, filth and cold draughts cause roup; avoid them.

REARING OF DUCKS.

In his previous articles, Mr. Barclay has dealt with the various breeds of ducks and discussed their suitability for West Indian conditions. In this, his third article, he deals with the question of food and feeding:—

FEEDING.

The feeding of ducks is really a simpler problem than that of fowls, but, as most people have been more accustomed to the latter, they try to make the same kind of food do for both, with bad results to the ducks. It has often been reported to me, that every other day one or two of So-and-so's ducks begin to get giddy, turn round about, and then topple over dead, and these were common or Muscovy ducks too, the hardest of all to kill by neglect or ignorance. I dealt with the subject in the *Journal of the Jamaica Agricultural Society* for January 1899.

There is a considerable physiological difference between fowls and ducks, and so a great difference in their natural habits and in their natural diet. The ancestor of the domestic fowl is the jungle fowl of India, occupying forest lands, feeding on seeds, insects, and green shoots, and roosting in trees at nights. The Mallard or wild duck, of which the domestic Rouen is the nearest domesticated relative, is, on the contrary, an aquatic bird, frequenting streams, lakes, and marshes, finding the bulk of its food in the water or on the banks. This food is of a soft nature, and they seldom eat hard seeds or grains.

Fowls have a capacious crop to hold food, from which it is passed to a large, strong gizzard which acts as a mill or grinding machine and, together with the little stones they pick up (and must have), reduces the hardest food to powder and pulp. The duck has a much smaller crop and gizzard than fowls, and the latter is far less powerful, so that they must not be fed quantities of hard food like corn. Fowls should be fed hard grain, together with a thick mealy porridge or paste or household scraps, as their only artificial soft food; a duck, on the contrary, can best get most of its food in a sloppy condition. If fed much corn, even with abundance of cool water (without water the corn would kill ducks in a few days), and the weather be hot, ducks will be subject to sickness and will probably drop off, through apoplexy, after a time. As ducks are more omnivorous even than fowls, and can thrive on wet, sloppy food, the food problem is simple with them.

If fowls are also kept, the same soft food as recommended for them will do as the morning meal, so long as the ducks are fed apart, that is, any meal stuff and house scraps made into a thick paste. The ducks will take water with every other mouthful, and so reduce it to a pap. If ducks only are to be fed, the soft food will then be made specially for them. With a wide range and streams, ponds, drains, or swampy lands, ducks will find the bulk of their food and may be fed in the evenings with any kind of food used for man; any kind of grain, ground fine; bananas, ripe or green boiled; boiled tannia (Jamaica 'cocoe'); yam; sweet potato; rice; corn; Guinea corn; peas—all hard grain being boiled or soaked until soft in hot water—together with any table scraps and meat stuffs. Ducks have to be kept under unnatural conditions, in order to secure their eggs and keep them safe from thieves. In a natural state they are nocturnal in habits, feeding in the evening on till early morning. But owing to their habit of not making a nest (in their tame state) but dropping their eggs anywhere, it is necessary to put them up at nights and keep them until the eggs are laid, which is generally in the early morning. This, too, is necessary to keep them from being killed by dogs or being stolen.

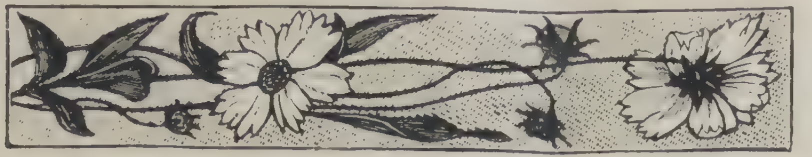
They do not range much in the day-time, in the West Indies, unless they have good shade; thus, they lose their opportunity of seeking their own food, except a forage heap be provided in the manner to be described later on. Ducks may be seen with their heads under their wings dozing in some cool, shady corner all day, but as soon as the late afternoon comes, they wake up and are soon chasing the flies and moths that come out so much in the evening here, and in doing so can move more quickly than they get credit for. After a heavy shower of rain, ducks will always be on the move and they find many worms that then come to the surface.

Fowls are always destructive in a garden, although useful in established coffee, cacao, banana walks, and in pastures, because of the quantities of grubs, beetles, worms and ticks they scrape up and eat, but ducks are of use in a garden for eating up slugs, caterpillars, and flies; therefore, for anybody who makes vegetable or flower gardening a favourite hobby, it is better to keep ducks than fowls—it will be less trying to the temper and more profitable to the pocket.

(To be continued).

ANTHRAX ANTITOXIN.

In previous numbers of this journal (Vol. II, pp. 35 and 121), information on the successful treatment of anthrax in certain countries was given. In his *Annual Report* on the advancement of pharmaceutical chemistry and therapeutics for 1902, Professor E. Merck discusses the efficacy of a new serum prepared by Professor G. Sobernheim, for the immunization of animals, primarily cattle, against infection by anthrax. The process consists in the simultaneous inoculation of the animals with active anthrax serum and a slightly weakened culture of the anthrax bacillus prepared according to a special process. It is stated that the treatment has, by numerous experiments on sheep and cattle, been shown to confer a high degree of immunity. 'In Pomerania, where the largest number of inoculations has been carried out, anthrax has completely disappeared from the herds where it had spread very widely, and since two years ago not a single animal has died of anthrax.' It is also mentioned that in several farms, where newly acquired and non-inoculated animals had been kept together with the older inoculated stock, the former were soon found to be infected by anthrax, whereas the inoculated animals remained perfectly healthy. The actual operation consists of an injection of 10 cc. (M. 160) of the serum on the left side of the neck of the animals, followed shortly after by an inoculation of a culture modified in a special manner. All other details are contained in the directions provided with the serum. Professor Merck has established laboratories in Halle, where the anthrax antitoxin is prepared and tested with respect to its potency under the permanent supervision and control of Professor Sobernheim.



SELECTION AND PACKING OF DISEASED PLANTS.

The following hints on the selection of portions of diseased plants, intended for scientific investigation in the laboratories of the Imperial Department of Agriculture, have been adopted from similar hints lately issued by the Royal Gardens at Kew. It is hoped that officers of the Department and others will carefully study and follow the suggestions here given:—

Mutual disappointment on the part of sender and receiver is too often experienced, when plants, supposed to be diseased, are submitted for examination. Principal among reasons for this state of things, are one or more of the following :—

1. The fragmentary nature of the material sent for investigation.
2. Lack of care in transmitting ; the specimen arriving shrivelled or dead or mouldy.
3. Absence of information as to the conditions under which the plant grew.

The following suggestions, if acted upon as far as practicable, would materially assist in reducing the number of such disappointments.

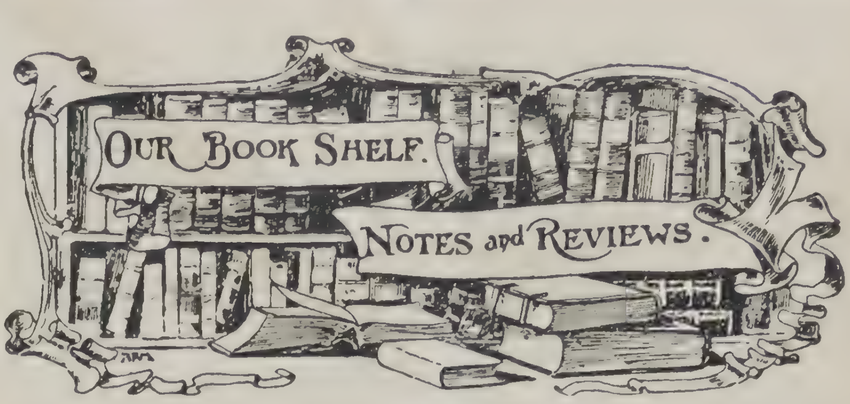
In selecting material, endeavour to illustrate every phase of the disease from the earliest indication of its presence up to the death of the part affected. In the case of an epidemic among herbaceous plants, cereals, etc., one or several entire plants should be sent. Detached leaves alone are, as a rule, useless. The root, after the soil has been shaken off, should be sent if practicable as, in many instances, the primary cause of trouble is located there ; the stem and leaves as a result of this root-disease, become limp and very susceptible to the attacks of fungi. Now it is obvious that examination of leaves or stem, in a case like the one just described, would fail to indicate the primary cause of disease in the plant.

Material for transmission through the post should be carefully packed in a box and wrapped up in waterproof paper. Never use cotton-wool for packing. Specimens sent in letters or paper parcels usually arrive dried up and useless.

Information as to the conditions of life of diseased plants is of value. If grown out of doors, the nature of the soil, drainage, aspect and surrounding vegetation should be noted. When grown under glass, state average temperature, humidity, method of watering, kind of fertilizer used ; also whether an apparently similar kind of disease had been previously observed.

In the West Indies where the air is usually moist and warm, care should be taken to allow for the aeration of fresh specimens sent for examination. If packed in an air-tight box, the specimens will, in a day or so, become covered with growths of numerous saprophytic fungi and quite useless for purposes of examination.

For further hints, the pamphlet (No. 17), on *General Treatment of Fungoid Pests*, pp. 41-3, published by the Imperial Department of Agriculture, should be consulted.


OUR BOOK SHELF.
NOTES and REVIEWS.

A COUNTRY READER. II. By H. B. M. Buchanan, B.A. (Cantab.). *London: Macmillan & Co., Ltd., 1903.* Price 1*s.*

This small volume gives descriptions of the habits and uses of some English domesticated and wild animals, and an account of pastures.

The domesticated animals described are the goat, donkey and cat. These chapters are full of interest ; the importance of close observation is emphasized ; numerous points in the habits of these animals are noticed and their bearing on the ancestry of the domesticated races are discussed. Great stress is laid upon the uses of the goat and its suitability for small holders, who have not grazing ground for a cow. The value of goat's milk is pointed out and it is said that the average yield of milk is about 2 quarts, while the milk is often sold for invalids at 1*s.* 6*d.* to 2*s.* per quart in England.

The wild animals mentioned are reptiles (lizards and snakes), frogs, toads and newts, and freshwater fish. These animals are, of course, different from those met with in the West Indies ; but application of the author's methods of observation and deduction to West Indian animals would, doubtless, be the means of bringing to light many new and interesting facts.

The notes on pastures are very valuable. Under this head are treated permanent or grazing pasture, mowing permanent pasture, and temporary pasture or seed pasture. The notes, although intended primarily for English conditions, are full of interesting and suggestive facts.

The illustrations are excellent and the book can be thoroughly recommended to any one interested in animal or plant life.

DEPARTMENT NEWS.

The third course of lectures to teachers in charge of Elementary Schools at Grenada (postponed last year on account of quarantine against Barbados) will be delivered at the Council Chamber, York House, St. George's, beginning on Wednesday, August 5 next, at 2 p.m. The lectures will be continued each day (Sunday excepted) until Wednesday, August 12, followed by an examination to be held on Thursday, August 13, beginning at 8 a.m. The lecturer, in this instance, will be Mr. Lawrence Lewton-Brain, B.A., of St. John's College, Cambridge, Lecturer in Agriculture on the Staff of the Imperial Department of Agriculture for the West Indies.

Among the Department publications issued to-day are Reports on the Botanic Station, Agricultural School and Land Settlement Scheme at St. Vincent for the year 1902-3 ; and a Report on the Experiment Station at Tortola, Virgin Islands, also for the year 1902-3. These reports may be ordered through all Agents of the Department, price three pence each.

GLEANINGS.

We are pleased to note that Mr. E. M. Cutting, the Barbados Scholar of 1901, has been placed in Class I, of the Natural Sciences Tripos, Part I, 1903, at Cambridge.

The Demerara *Daily Chronicle* of July 1, mentions that upwards of 3,000℔. of balata arrived at Georgetown on June 14, while the North-West steamer brought in, on June 21, about 900℔. of Venezuelan balata.

It is evident that things agricultural are moving steadily at Jamaica. The Jamaica Agricultural Society has now thirty-nine branches with a total of 2,406 members. Eleven agricultural shows were held in the colony during the year 1902.

Drawing attention to the Central Factory Scheme at Antigua (*Agricultural News*: Vol. II, pp. 99 and 131), the *Louisiana Planter* of June 20, says:—'The subject is one of paramount interest to the British West Indies, and we hope the venture will be entirely successful.'

According to Mr. George S. Hudson, the Agricultural Instructor, the first small shipment of concentrated honey from St. Lucia was made this month. It will be interesting to note the reception it meets with in the London market.

A sale of 3,000 tons of raw sugar for the English market closed recently in Havana at $1·85 per ℔. This is the first sale of sugar for Europe in Cuba within the last 25 years, with the exception of 5 per cent. of the output which formerly went to Spain, but which ceased at the outbreak of the Spanish-American war.

Referring to the increase in the direct trade between Jamaica and Canada, the Jamaica *Gleaner* of June 24, states that, while in 1901-2 but 12,608 bunches of bananas were shipped from that island to Canada, in 1902-3 no fewer than 120,868 bunches went direct. For oranges, the figures are—1901-2, 4,058,050; 1902-3, 7,545,600. The direct export of oranges to Canada exceeds that to the United Kingdom.

The Ceylon *Administration Report* for 1902 states that twelve plants of *Coffea stenophylla* ('bush' or 'native coffee' of Sierra Leone), received from Kew in 1894, have produced a good crop of fruit for the first time at the Peradeniya Gardens. Fruiting was retarded by their being planted out, at first, in an unsuitable situation, where they made but little progress, and by being again transplanted, in 1898, to their present position, viz: in the experiment plots. The berries are small, but are reputed to be superior to all other coffees in point of flavour. Most of the seeds produced have been sown.

It is stated in *Indian Planting and Gardening* of April 11, that the Indian sugar-cane crop of the season 1902-3 is, on the whole, considerably inferior to what it was last year.

Cacao flowering in St. Lucia commenced early this year; viz: at the beginning of May, but the first flowers and pods have not held well, except in the older and more vigorous plantations.

A complete solar rainbow was observed at Barbados between 10 and 11 a.m. on July 4. A similar circle round the sun was also seen here on May 6 last (see *Agricultural News*: Vol. II. p. 172).

A clear illustration of a Cowan eight-frame capacity reversible honey extractor, designed to be driven by means of power other than hand, appears in *Gleanings in Bee Culture* for June 1. This machine has a powerful, street-car hand brake, and should be especially useful in large apiaries.

On June 18, Mr. Bruce-James delivered a lecture at the Middle School, Demerara, on 'Plant Life and Roots.' The lecture was illustrated by magic lantern slides. According to the Demerara *Daily Chronicle* of July 1, it is intended, in the future, to extend this method of illustration.

In the *Administration Report* for 1902, the Curator of the Peradeniya Gardens, Ceylon, mentions that of two plants of *Theobroma pentagona* received from Trinidad in 1895, one only survives. This, last year, bore fruit for the first time. The pod is said to be readily distinguished from all other varieties of cacao, having five large longitudinal ridges or wings. Three more plants of this species were received from Kew in the latter part of 1900, and have this year been planted out alongside the above.

The West India Committee Circular for June 8, mentions that 'Mr. George Hughes, to whom the credit for the invention of 'Molascuit' is due, states that it is most desirable that the proportions of 20 per cent. dry megass meal and 80 per cent. of molasses, minimum 40° B., should be carefully adhered to, and that the moisture in the manufactured article should be kept round about 15 per cent. There should also be uniform weights in the bags. If these points are carefully carried out, they will greatly facilitate the development of the business by creating confidence in the buyers.'

An extraordinary instance of the prosperity of Indian emigrants in suitable colonies has just been furnished by a shipload of these people, who returned to Calcutta on February 24, by the Steamer 'Mersey' from Trinidad. There were 737 returning emigrants on board, and they landed bringing nearly £10,000 in drafts, coin, and jewellery. State-regulated emigration to Trinidad has gone on, now, for upwards of half a century, and the carefully kept records disclose the fact that, since 1851, when the first Indians began to come back, the returned emigrants have brought with them savings to the value of £386,000 actually declared. This is, of course, merely what they have carried back on their persons and in their pockets, and takes no notice of the large sums that are remitted to India as they are saved. (*The Pioneer*, Allahabad).

BEE'S-WAX IN THE UNITED KINGDOM.

In a previous issue of this journal (Vol. II, p. 165), we reproduced some extracts, dealing with the importation of honey into the United Kingdom, from a paper read by Mr. Samuel T. Frost, before a meeting of the Chemists Assistants' Association. The following notes, on the importation of bee's-wax, are taken from the same paper:—

A great deal of bee's-wax imported into this country does not find its way into Mincing Lane, but is shipped direct to the manufacturers or wholesale dealers from Jamaica, Zanzibar, Madagascar, New Zealand, Australia, Spain, India, and Morocco. A certain proportion of the wax that is offered for sale in the drug market is grossly adulterated; not artistically, so as to require the services of an analyst to detect the adulteration; but with such things as stones, earth and dead leaves, and some of it is very wormy. Like honey, the imported wax varies greatly in colour and quality, ranging from white, through all the shades of yellow and brown, to black. Perhaps the article for which there is the greatest demand in the open market is Jamaica wax, which is shipped in barrels, casks, and cases weighing from 2 to 4 cwt., and always finds an unlimited sale in London on account of its undoubted purity. The prices range from £7 10*s.* to £8 15*s.* per cwt., and occasionally there is very active competition for it. Its principal uses are for boot and furniture polishes, heel-ball, tailors' wax, photographic compositions, etc. The total exports from Jamaica in 1898 were valued at £10,294, against £4,823 in 1888; while the value of the honey exported from Jamaica during the same years was £2,103 against £1,341. The United States has increased her imports of wax from Jamaica; while the amount coming to the United Kingdom has decreased. The increased production of wax in Jamaica is very largely due to the intelligent action of the local agricultural societies, backed up by the Imperial Department of Agriculture, in encouraging a better system of apiculture. Jamaica wax varies in colour from a nice pale brown and yellow to good red, and pale to dark brown, or chocolate colour.

ROBBER BEES.

Mr. Leslie Alexander, of Malvern, Jamaica, writing in *Gleanings in Bee Culture* for June 1, last, mentions a simple and effective method of branding robber bees. Mr. Alexander says:—

The entire colony that is being robbed is banked with hay which is freely sprinkled with a brush dipped in whitewash containing about a tablespoonful of turpentine. Every robber is branded 'white,' and the bee-keeper can then detect the colony from which the robbers are issuing, when the entrance is forthwith closed. No matter how thickly the hay is placed around a colony, the bees get ample ventilation, and at night the covering may be removed. The whitewashing is, of course, superior to dusting with flour; and, since it saturates the hay, the bees get disgusted as soon as their bodies get foul and sticky, while the smell of the turpentine adds to their disgust.

AGRICULTURAL SHOWS.

Jamaica.

The Jamaica *Gleaner* of June 29, mentions that the first Agricultural Show in St Mary, was held at Port Maria on June 25. His Excellency, Sir Augustus Hemming, G.C.M.G., attended, and was presented with an address by the Executive Committee. After his reply, his Excellency declared the show open.

The exhibits are said to have been remarkably good, and both these and the attendance to have been thoroughly representative of the parish. All classes are stated to have worked well with the Executive Committee to render the show an undoubted success.

The exhibits comprised the following:—Horse kind (26 classes), including driving and riding competitions, mules and asses; cattle (12 classes); sheep; goats; pigs; dogs; cats; poultry; rabbits; turkeys; ducks; eggs; minor products, including cured cacao, cacao pods, prepared chocolate, prepared kola, coffee in parchment, cured and cleaned coffee, cured pimento, cured tobacco, and cured nutmegs; meals and starches, including cassava, tapioca and arrowroot starch; fruits, including bananas, grape fruit, limes, oranges, navel oranges, plantains, water melon, and cocoa-nuts; and bee-keeper's exhibits, including extracted honey, modern implements and hive, hive of bees, and wax.

British Guiana.

The Demerara *Argosy* of July 1, states that the prize-list of the second biennial agricultural, poultry, and industrial show to be held on August 10, under the auspices of the Buxton and Friendship Farming Association, has been issued. Over $300 will be awarded in the various competitions. His Excellency the Governor offers $150 in special prizes, including $50 for vanilla, and $50 for Para rubber. It is expected that the different sections will draw full entries, and that the show will be attended with a large measure of success.

LEGUMINOUS CROPS AND NITROGEN.

The Canadian Department of Agriculture has issued a series of reports on the work of the experimental farm at Ottawa, including an interesting paper by Dr. Saunders, the Director, and Mr. Shutt, the Official Chemist, on clover as a fertilizer. The most expensive manure which the farmer needs to add to his soil is nitrogen. From four to six hundred pounds per acre are removed annually by various crops, but it is found that clover actually increases the nitrogen. Planted at the same time as the corn, it sends its roots deep down into the soil, sometimes 4 feet, and brings up plant food near the surface. When the corn is cut the clover flourishes, and enriches the soil for the next season. Clover does this owing to the remarkable fact that it has formed a defensive alliance with a little microbe which is able to feed on the nitrogen in the air. Little nodules, some of them as large as a pea, form on the clover roots, and in these the microbes live, protected from all surrounding danger, and absorbing the atmospheric nitrogen in the soil, which they convert into food for the plant. Thus the clover and the microbe together go on drawing from the air, and leaving a rich manure in the soil to feed the corn nitrogen that would be ruinously costly, if it had to be purchased as a manure.

ANTIGUA.

Cotton Cultivation.

A large and important meeting of landowners and others in Antigua was held in the Council Chamber on Monday, June 29, his Excellency Sir Gerald Strickland, K.C.M.G., in the chair. The following is a brief summary of an address presented by the Imperial Commissioner of Agriculture:—

Having reviewed the present favourable conditions connected with the cotton industry, Sir D. Morris gave a sketch of what had already been done by Mr. Watts and others, to bring the subject under the notice of the planters of Antigua. It had been pointed out that the best class of cotton, known as Sea Island cotton, was a native of the West Indies and, therefore, well adapted to the conditions of soil and climate existing here. Efforts should be made to produce a high and uniform grade of cotton in Antigua so as to establish well-known marks and thus secure ready sales at maximum prices.

Mr. Watts, last year, promised that the Imperial Department of Agriculture would afford active assistance to those who were prepared to grow cotton and Sir D. Morris stated that, in the absence of Mr. Watts, he was prepared, with the assent of the Governor, to fulfil the pledges given to the planters and do all that was possible to start a large and successful cotton industry in the island.

The latest information was entirely favourable as to the future of cotton and prices were exceptionally high. Continuing, Sir D. Morris stated that, after consultation with Sir Gerald Strickland, it was proposed to assist the planters in Antigua (1) by supplying them, free of cost, with good cotton seed; (2) by affording assistance and advice in regard to the selection of land, the methods of cultivation and the treatment of insect and fungoid pests; (3) by erecting at St. John's a central cotton factory with ginning machines and baling presses driven by steam power and capable of dealing effectually with all the cotton produced in the island.

A careful and discriminating estimate had been formed of the probable cost of establishing cotton in Antigua and it was understood that about £4 per acre would cover all expenses up to the time of picking the cotton. Other expenses might be placed at 15*s.*, making a total of £4 15*s.* per acre. The crop would probably reach not less than about 300 ℔. of lint per acre, and this, at the low valuation of 7*d.* per ℔., would realize £8 15*s.*, leaving a net profit of £4 per acre, obtained, it should be remembered, within eight months. There would also be a ratoon crop to be reaped soon after.

It was shown that cotton planting was a simple operation, requiring very much the same kind of treatment of the land as that of the sugar-cane. The labour of picking the cotton was well suited for women and children and thus a large section of the peasant population of the island, now almost destitute, could be suitably employed and earn good wages.

Sir. D. Morris' address received great attention and his remarks were followed with deep interest. A very animated discussion followed, in which his Excellency the Governor and all the leading planters took part. Mr. John Foote announced that he was prepared to plant 100 acres in cotton and it was stated, on behalf of Mr. Comacho, that he was likely to plant about 80 acres. Mr. Cowley, Mr. Spooner and others also expressed their intention to embark in the industry. Altogether, it is not improbable that about 400 acres will be established in cotton in Antigua, during this year.

Arrangements are being made for erecting a central cotton factory at the Government Wharf at St. John's, and by these means it is anticipated that all the cotton, grown in Antigua, will be successfully ginned and baled and shipped in such a condition as to thoroughly test its value on a commercial scale.

DEPARTMENTAL REPORTS
AFM

BOTANICAL DEPARTMENT, TRINIDAD: ANNUAL REPORT FOR THE YEAR ENDED MARCH 31, 1903. By J. H. Hart, F.L.S., Superintendent.

Mr. Hart states that two courses of lectures have been given during the year; the first course was held in August 1902, and was intended, primarily, for the cadets at the Botanic Station; the second course, in December 1902, was for students at the Training Schools for teachers. Mr. W. Leslie has been appointed to be Senior, and Mr. H. A. Nurse to be Junior Agricultural Instructor. Both officers have been actively engaged on their duties.

The lawns at Government House Gardens have suffered from the attack of the mole cricket, and these gardens have also suffered from the parasol ants. To combat the latter, a large expenditure was found necessary. The number of visitors to these gardens has greatly increased.

Bee-keeping has made satisfactory progress. Italian queens were imported and have been found greatly superior to the black bees.

The experimental plots of rubber plants have made good progress. It was found that *Funtumia* trees, four and a half years old, gave good rubber, while that from *Castilloa* trees of the same age was evidently immature. The latex of *Funtumia* is more easily coagulated than that of *Castilloa*. It would seem that *Funtumia* possesses a hardy constitution and is well suited for cultivation in Trinidad and places with a similar climate.

The work of raising seedling canes has been continued, but Mr. Hart states that the area of land at his disposal, at St. Clair, forbids their trial on a large scale. A number of varieties was sent to the Imperial Department of Agriculture, for trial in comparison with the seedling canes raised in Barbados, and some of them gave good results.

The cultivation of cotton is receiving attention, and trial shipments have been sent to the British Cotton Growing Association.

Cassava Poisoning. The writer of a letter to the St. Croix *Avis* of May 20, states that the 'skin' of the bitter cassava root is an antidote to the cassava poison. In support of his statement the writer mentions that pigs will eat the roots with the skin and not suffer, but, if given these with the skin scraped off, they die shortly afterwards.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—June 23, 1903.—Messrs. Kearton Piper & Co., and 'The Public Ledger,' June 13, 1903.

Aloes—Curaçoa, 14/6 to 30/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, $1\frac{7}{8}$*d.* to 4*d.* per ℔.
Bee's-wax—£8 to £8 2*s.* 6*d.* per cwt.
Cacao—T'dad, 58/- to 67/- per cwt.; Jamaica, 50/- to 56/- per cwt.; Grenada, 52/- to 58/- per cwt.; Dominica, 52/- to 54/- per cwt.
Cardamoms—Mysore, 1/4 to 3/4 per ℔.
Coffee—Jamaica, 34/- to 105/- per cwt.
Cotton—West Indian, $6\frac{5}{8}$*d.* to $6\frac{1}{2}$*d.* per ℔.
Fruit—
  Bananas—6/- to 7/6 per bunch.
  Oranges—No quotations.
  Pines—Jamaicas, 4*d.* onwards each; Antiguas, 10/- to 16/- per barrel.
Fustic—Dull.
Ginger—40/- to 68/- per cwt.
Honey—Jamaica, 17/6 to 25/- per cwt.
Isinglass—West Indian, 1/11 to 2/8 per ℔.
Kola Nuts—1*d.* to 4*d.* per ℔.
Lime Juice—Raw, 1*s.* 1*d.* to 1*s.* 3*d.* per gallon. Concentrated, £15 per pipe.
Logwood—No quotations.
Mace—1/9 to 2/5 per ℔.
Nitrate of Soda—Agricultural, £9 7*s.* 6*d.* to £9 10*s.* 0*d.* per ton.
Nutmegs—70's to 75's, 1/5 to 1/8; 80's to 90's, 1/1 to 1/3 per ℔.
Pimento—$2\frac{1}{2}$*d.* to $2\frac{3}{4}$*d.* per ℔.
Rum—Demerara, $8\frac{1}{2}$*d.* to 10*d.* per proof gallon. Jamaica, 1/6 to 8/- per proof gallon.
Sugar—Muscovado, 7/- to 14/-; Crystallized, 14/4 to 15/6 per cwt.
Sulphate of Ammonia—£12 15*s.* to £12 17*s.* 6*d.* per ton.
Tamarinds—Barbados, 11/- to 11/6 per cwt.; Antiguas, 7/6 to 8/6 per cwt.

New York,—June 12, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, $1·30 to $1·35; eight hands, $1·00; seven hands, 70c. per bunch.
Cacao—African, 12c. to $12\frac{1}{2}$c.; Caracas, $12\frac{1}{2}$c. to $13\frac{3}{8}$c.; Jamaica, $10\frac{1}{2}$c. to $11\frac{5}{8}$c.; Grenada, 12c. to $12\frac{1}{4}$c.; Trinidad, $12\frac{1}{4}$c. to $13\frac{1}{4}$c. per ℔.
Cocoa-nuts—Trinidads, $17·00 to $18·00; Jamaicas, $19·00 to $21·00 per M.
Coffee—Jamaica, ordinary to good ordinary, $5\frac{1}{2}$c. to 6c. per ℔.; Manchester grades, 8c. to $10\frac{1}{2}$c. per ℔.
Ginger—Jamaica, $7\frac{1}{2}$c. to $8\frac{1}{4}$c. per ℔.
Pimento—5c. per ℔.
Rubber—Nicaragua scrap, $67\frac{1}{2}$c. to 68c. per ℔.; Guayaquil strip, 61c. to 62c.
Sugar—Muscovado, 89°, $3\frac{1}{8}$c per ℔.; Centrifugals, 96°, $3\frac{19}{32}$c.; Molasses, 89°, $2\frac{29}{32}$c. per ℔.

INTER-COLONIAL MARKETS.

Antigua,—July 1, 1903.—Messrs. Geo. W. Bennett Bryson & Co., Ltd.

Molasses—22c. per gallon, package included.
Sugar—$1·45 per 100 ℔.

Barbados,—July 4, 1903.—Messrs. T. S. Garraway & Co. and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·75 per 100 ℔.
Cacao—$12·50 per 100 ℔.
Cocoa-nuts—$10·00 to $11·00 per M. (Husked Nuts).
Coffee—Jamaica and ordinary Rio, $8·00 to $8·50 per 100 ℔.
Hay—New Brunswick, $1·00 per 100 ℔.
Manures—Nitrate of Soda $60·00; Ohlendorff's Dissolved Guano $60·00; Sulphate of Ammonia $80·00; Sulphate of Potash $67·00 per ton.
Molasses—18c. per gallon, and $4·00 for puncheon.
Onions—Madeira, $2·31 to $3·40 per 100 ℔.
Potatos, English—$3·00 to $3·27 per 100 ℔.
Rice—Ballam, $4·60 per bag (190 ℔.); Patna, $3·50 per 100 ℔.; Rangoon, $2·75 per 100 ℔.
Sugar—In hogsheads, $1·20 per 100 ℔., and $5·00 for hhd. In bags, $1·45 per 100 ℔.

British Guiana,—July 2, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $9·50 to $10·00 per barrel.
Cacao—Native, 11c. to 12c. per ℔.
Cassava Starch—$9·00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 11c. to $11\frac{1}{2}$c. per ℔. (retail).
—Creole, 11c. to 12c. per ℔.
Dhal—$3·00 to $3·40 per bag of 168 ℔.
Eddoes—$1·68 per barrel.
Molasses—Vacuum Pan, yellow, 16c. per gallon, casks included.
Onions—2c. to $2\frac{1}{2}$c. per ℔.
Pea Nuts—Curaçoa, $3\frac{3}{4}$c.; American, 5c. per ℔. (retail).
Pigs—Young Boars and Sows, $5·00 each.
Plantains—24c. to 40c. per bunch.
Potatos, English—$3·50 to $4·50 per barrel.
Rice—Ballam, $4·70 to $4·75 ex store; Patna and Seeta, $5·60 to $5·75 per bag.
  Creole Rice, 20c. per gallon (retail).
Sweet Potatos—Barbados, 96c. per barrel.
Tannias—$1·92 per bag.
Yams—$2·40 per bag.
Sugar—Dark Crystals, $1·80 to $1·81; Yellow, $2·25 to $2·40; Molasses, $1·80 to $1·90 per 100 ℔.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—July 2, 1903.—Messrs. Gordon Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Very little doing.
Cacao—Ordinary, $11·75 to $12·00; Estates, $12·75 per fanega.
Coffee—6c. to $6\frac{1}{4}$c. per ℔.
Onions—$2·00 to $2·25 per 100 ℔.
Potatos, English—$1·75 per 100 ℔.
Rice—Yellow, $4·20 to $4·35; White Table, $5·50 to $5·80 per bag.
Sugar—White Crystals $3·25; Yellow Crystals for local consumption, $2·10 to $2·25 per 100 ℔.
—Molasses sugar, $1·80 to $2·00 per 100 ℔.

THE BEST MANURES FOR COLONIAL USE

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Ohlendorff's Dissolved Peruvian Guano—For Sugar-cane and general use

Ohlendorff's Special Sugar-cane Manure

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[46.]

"CACAO."

BY

J. H. HART, F.L.S.

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Present supply of plants exhausted. Orders now booked for 'Top' and 'Cane' plants for delivery next November. 50 cents per 100.

Analysis of Juice by Professor d'Albuquerque:—

	Stable Field.	*Lymphs Field.*
Specific gravity	1·0853	1·0848
Saccharose lb. per gallon ...	2·091	2·106
Glucose lb. per gallon ...	·048	·042
Solids not Sugar	·184	·163
Quotient of Purity... ...	90·01	91·13
Glucose ratio	2·29	1·99

RESULTS OBTAINED ON ESTATE.

30 clumps weighed 1,610 lb.
Equal to, per acre, (5x5) 41·75 tons.
30 clumps gave 112 gallons juice.
Equal to, per acre, (5x5) 6,500 gallons.
Very Strong, Large Grain Sugar obtained in Boiling House.

The Cane possesses a very hard rind and parts readily with its dry leaves.

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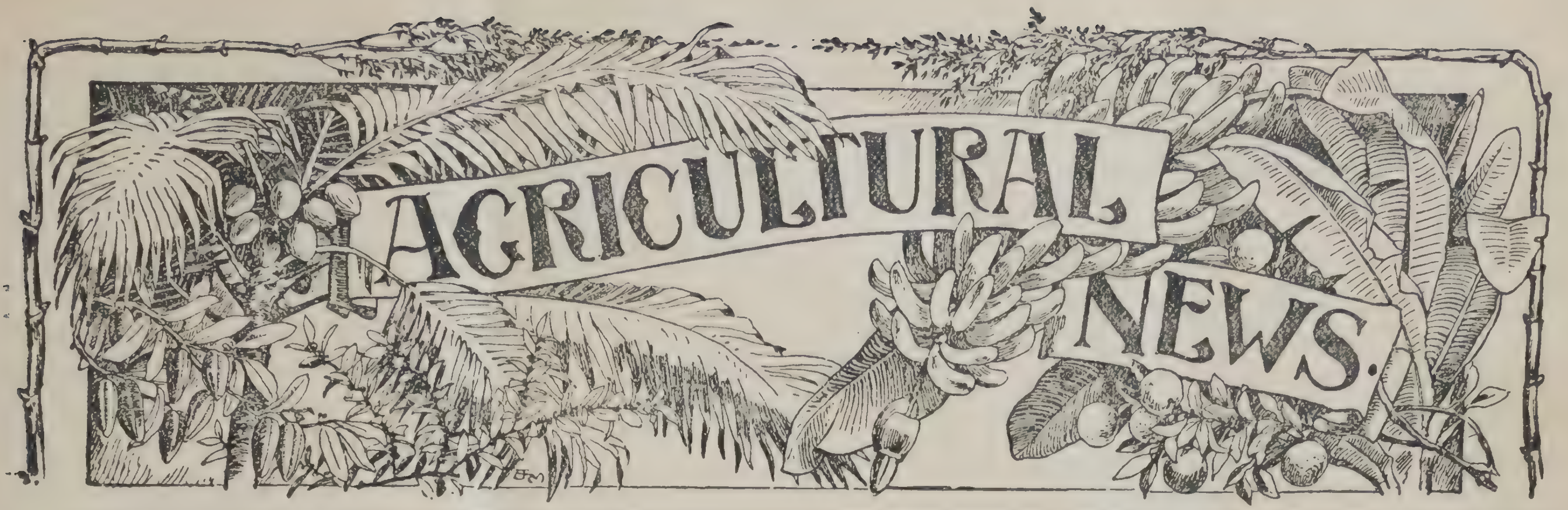

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. II. No. 34. BARBADOS, AUGUST 1, 1903. PRICE 1*d*.

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Cotton Cultivation.

(Continued.)

IN the last issue of the *Agricultural News* there was given a general summary of the present position and prospects of the Cotton Industry in the West Indies. It was mentioned that from the returns recently to hand, it was not improbable that about 4,000 acres were likely to be placed under cotton in the Windward and Leeward Islands and Barbados during the present planting season. There is also the area proposed to be planted in cotton at Jamaica, British Guiana, Trinidad and Tobago.

The new cotton industry in the smaller islands, apart from the purchase of machinery and the erection of buildings, etc., will be the means of immediately distributing something like £12,000 in wages to be paid for breaking up and preparing the land, in planting, weeding and picking the cotton, and in ginning and baling it ready for shipment.

With moderate success, the area above mentioned should yield about 3,600,000 ℔. of seed-cotton which, when ginned, should give 2,400,000 ℔. of cotton seed and 1,200,000 ℔. of cotton lint. At a moderate estimate of 8*d*. per ℔., the cotton lint would be worth £40,000 and the cotton seed, if shipped, at £6 per ton, would be worth about £6,428. If, however, as is hoped, the cotton seed is not exported, at all, but retained for the extraction of oil and the resulting meal or cake fed to animals and returned to the land in the form of manure, the value of the cotton seed would be more than trebled. Cotton is a fairly exhausting crop, and as the seeds contain a large share of mineral constituents, they should be retained, and not shipped. This, and similar questions, can be dealt with later. The chief points to be now considered are (1) the importance of realizing the value of a large and successful cotton industry to these colonies, and (2) the importance of urging upon every one connected with cotton planting, the necessity of making a supreme effort to ensure that the present cultivation will fully realize expectations.

The results of the current season's planting will naturally have an important bearing on the amount of land to be placed under cotton during the season of 1904-5. There is a reasonable hope that the prices for the coming crop will be satisfactory, possibly above the average; but if it should happen, owing to a bad selection of land, wide planting, neglect of cultivation, unfavourable seasons, attacks of disease or other causes, that the returns per acre are small and disappointing, this must have a discouraging effect on the progress of the industry. Instead of steadily extending cotton cultivation and making it second only to sugar, we shall have to wait until enterprise and energy are available to overcome the initial difficulties inseparable from any new industry.

We have confidence, however, that those who are now taking up cotton planting in these colonies, are prepared to do all they can to make this season's planting a success. They have been plentifully supplied with seed of all the principal kinds of cotton suitable for cultivation in the West Indies. The seed was tested beforehand and it has germinated satisfactorily. The larger areas are naturally planted with Sea Island cotton. This is likely to suit the climatic conditions of the West Indies better than any other. Indeed, the original stock is claimed to have been obtained from these islands. According to Brooks:—

'The Sea Island cotton plant has a larger and more vigorous growth than Upland cotton. It withstands the vicissitudes of the heat and cold better, and it is less subject to disease; the so-called blight and rust do not affect it as readily as they do the Upland cotton, nor does it shed its flowers and bolls to anything like the same extent. The early growth of the Sea Island is so vigorous, that it maintains itself in fields infested with Bermuda and nut grass, as the Upland could not. The leaves are larger, smoother, and of a brighter green than Upland, and the flowers are larger, handsomer, and of a more golden yellow. But the bolls are smaller, and instead of being five-lobed are usually only three-lobed.'

In addition, some of the best varieties of Upland cotton are being planted, in order to compare the returns with those of Sea Island cotton. A few small areas are planted with a special sort of Peruvian cotton recommended as the best for mixing with wool. There are also several plots planted with selected varieties of Egyptian cotton. Care has been taken that these different varieties are not planted too closely to one another to become crossed. In any case, it has been resolved, this year, to try as many sorts as possible, and should it be decided to adopt any two or more for general cultivation in 1904-5, arrangements will be made to import the seed direct, rather than trust to what is produced locally. Even on the coasts of Florida and other parts of the United States, where Sea Island cotton is cultivated, the seed is obtained annually, or biennially, from the islands off the coast of South Carolina. Until we have established good local strains, it will probably be necessary to follow a similar course in the West Indies.

As regards details of cultivation it is recommended, in addition to other operations, to 'mould up' the plants when about 6 to 10 inches high. This will add to their stability and prevent injury from strong winds. On very exposed fields a head-row of Guinea corn might be planted to shelter the cotton plants. Finally we would repeat what we have already endeavoured to impress upon the planters, viz., that they should keep a watchful eye for insect and fungoid pests and immediately communicate specimens and seek the advice and assistance of the officers of the Imperial Department of Agriculture.

SUGAR INDUSTRY.

Varieties of Canes under Cultivation at Barbados.

In the *Agricultural News* (Vol. I, p. 35; Vol. II, p. 194) there was published a return showing the area under cultivation in British Guiana with varieties of sugar-cane other than the Bourbon cane.

It is now proposed to publish a somewhat similar list showing the estimated area under cultivation with the several varieties of cane, *other than the Bourbon cane*, at Barbados.

This list, containing an estimate of the canes reaped in 1903, has been prepared by Mr. J. R. Bovell, F.L.S., F.C.S., based on returns furnished to him by planters.

The total estimated area under sugar-cane in Barbados is 35,000 acres. The Bourbon cane was at one time the principal cane grown in the island. At present, owing to the prevalence of disease, it is estimated that only about 327·4 acres are planted in Bourbon cane. The principal cane now cultivated in Barbados is the White Transparent, 18,580·7 acres. This is followed by Rappoe, 3,089·2 acres; Caledonian Queen, 1,661 acres; B. 147, 1,642·2 acres; Mont Blanc, 699·1 acres; Sealy Seedling, 673·6 acres; Queensland Creole, 447·9 acres; B. 109, 439·8 acres; B. 208, 341·5 acres.

The approximate return furnished by Mr. Bovell is as follows :—

Name of cane.	No. of acres.	Name of cane.	No. of acres.
		Brought forward ...	34,217·3
White Transparent	18,580·7	Burke	181·0
Mixed Plants ..	6,123·0	Green Transparent	137·5
Rappoe...	3,089·2	B. No. 156	102·5
Caledonian Queen	1,661·0	St. Kitt's cane ...	7·4
B. No. 147	1,642·2	Sport Ribbon ...	4·0
Mont Blanc	699·1	B. No. 347	2·7
Sealy Seedling ...	673·6	B. No. 376	2·4
Queensland Creole	447·9	B. No. 69	2·0
B. No. 109	439·8	Java	0·7
B. No. 208	341·5	Sport White... ...	0·7
Ribbon Transparent	267·5	B. No. 969	0·7
Naga B.	264·8	B. No. 1335... ...	0·7
Carried forward ...	34,217·3	Total	34,672·6

As already stated, these figures are approximate only. If, to the above total of 34,672·6 acres we add the estimated area under Bourbon, viz: 327·4 acres, we obtain the approximate total of 35,000 acres under sugar-cane in Barbados.

Remarkable Sugar-canes in Florida.

The following note on the sugar and glucose content of certain varieties of sugar-cane has been contributed by Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S.:—

The juice of the sugar-cane contains crystallizable sugar called *saccharose*, and uncrystallizable sugar called *glucose*. Of these, the former alone is of value in the sugar factory. During the early stages of growth the proportion of glucose to saccharose in the juices of the cane is high, but, as the cane approaches maturity, the proportion of glucose becomes less and less and that of the saccharose, greater and greater. Theoretically, therefore, we might expect that, at the period of complete and perfect maturity of the plant, all the glucose would disappear, having been converted into crystallizable saccharose. As a matter of fact, however, when the glucose is reduced to a minimum on approaching maturity, any deterioration of the plant, due to long standing, over-ripeness or other cause, reverses the order of things, leading to an increase of uncrystallizable glucose at the expense of the saccharose; and, as a matter of fact, it is usual, in the samples of juice analysed in the boiling house, to find constantly a small and varying proportion of glucose.

In the issue of the *Louisiana Planter* of June 20, Professor Wiley records the analyses of four samples of juice, remarkable for the fact that they contain no glucose. They contained from 18 to 19·8 per cent. saccharose, the quotient of purity varying from 88 to 91 per cent.

These samples of juice were expressed from canes grown at Mr. Abel's Terra Ceia farm, Manatee County, Florida. The name of the variety is not mentioned; they were grown, within 150 yards of salt water, in a soil sandy to a depth of 12 to 18 inches, with a thin stratum of subsoil resting on clay. The canes, being in an outside row near timber, got little cultivation and practically no fertilizer; they were seventeen months old from the time of planting.

Sugar Beet Cultivation in Europe.

The Demerara *Argosy* of June 20, states that the following is the result of the inquiries made on June 9, by the International Sugar Statistical Association on the subject of the beet sowings in Europe:—For 1,330 factories which will work in 1903-4 against 1,053 factories in 1902-3, the total surface shown comes to 1,649,049 hectares (over 4,100,000 acres) against 1,691,326 hectares (over 4,200,000 acres) in 1902, or 2·5 per cent. less than last year. There is a diminution of 5·8 per cent. for France, 4 per cent. for Germany, and 5·5 per cent. for Russia. There is an increase of 0·8 per cent. for Austria-Hungary, of 9·9 per cent. for Belgium, of 3 per cent. for Holland, and of 19·1 per cent. for Sweden. In Denmark there is no change. In 1902, the sowings fell off 23·8 per cent. in France, 11·2 per cent. in Germany, 16·2 per cent. in Austria-Hungary, 24 per cent. in Belgium, 35 per cent. in Holland, and 16·4 per cent. in Sweden, against an increase of 1 per cent. in Russia and 4·8 per cent. in Denmark. On the whole, the cultivation of beet fell off 11·3 per cent. in 1902 as compared with 1901.

THE HISTORY OF TEA IN JAMAICA.

The *Bulletin of the Department of Agriculture, Jamaica*, is publishing a series of historical notes on the economic plants of the island. The fifth article of the series appears in the last number and is devoted to tea.

The first introduction of tea into Jamaica seems to have been in the year 1771, by a Mr. Baker, under the name of the Bohea tea tree. Another tea plant was planted in the first Government Botanic Garden at Enfield by the first Island Botanist, Dr. Thomas Clarke, in 1775. Plants propagated from these were grown in Mr. Wallens' garden at Coldspring, where there were still to be seen tea plants as late as 1887. In the years 1849-50, plants of Assam tea were sent out from Kew Gardens to the Island Botanist, Mr. Nathaniel Wilson, at Bath Garden. Eighteen years later over 600 plants were received from India in excellent condition. The annual reports of the Island Botanist for the following years all refer to the experimental tea cultivation.

Between the years 1872 and 1874, fair samples of tea were prepared by a coolie who had been employed in the Assam plantations; later, in 1876, a sample sent to the International Exhibition at Philadelphia was reported on by the judges as being a tea of good quality, and was awarded a medal.

In 1886, samples of tea were forwarded to the Indian and Colonial Exhibition, and Mr. A. G. Stanton, the tea expert, reported that these samples were 'delicate in flavour and of good quality.' In the following year, Mr. Stanton again reported upon Jamaica tea, sent by the Director of Public Gardens. The three samples were valued at 1*s.* 1*d.*, 1*s.* 2*d.* and 1*s.* 8*d.* per lb., respectively. At the present time, the only tea plantation of any size is that of the Hon'ble H. E. Cox, of St. Ann, who has planted out about 60 acres, and obtained the latest machinery. Mr. Cox's tea is of a very good quality.

Last May, Jamaica was visited by Mr. Royal Dawson, a tea-planter of great experience in India, for the purpose of inquiring into the prospect of extensive tea cultivation. He considers that the valleys of the Blue Mountain range are admirably adapted to tea growing, and decidedly recommends the Assam variety.

WEST INDIAN FRUIT.

ORANGES AT JAMAICA.

The following note, on orange growing at Jamaica, is taken from the *Annual Report of the Jamaica Agricultural Society*, published June 30, 1903:—

At most shows now the fruit is shown stem-cut, clean, and graded. This improvement is also practised now more generally in shipping. The best citrus fruits appeared at Kendal Show,—navel oranges from Saint Ann, and lemons from Mandeville, lovely fruit and almost perfect. Grape-fruit is often dull in colour, which would probably be remedied by thinning out young fruit from their clusters as is done with grapes. The problem of orange growing here is to get fruit in August, September, and October, for then there is little or no competition; even October can only be taken advantage of, in the event of the rains holding off late in that month. The most careful treatment in picking, curing, and packing, often goes for little when the heavy rains are on. The greatest cultural trouble among orange growers has been the loss caused by the grub of the Fidler beetle eating the root of the citrus trees. Whole groves have been practically killed by this pest, causing great loss and disappointment in what was considered hopeful enterprise. The subject has been very minutely dealt with and remedies have been much discussed and experimented with. Some of the insecticides applied to the roots and found to kill the grubs were, however, held by the growers, to be prohibitory owing to their expense. The picking of the parent beetle has been in regular practice and will in time, no doubt, diminish the trouble.

It is evident, however, that the encouragement of a natural enemy of the beetle or its larva would be the simplest solution of the difficulty, and might indeed, be the only way to put an orange grove on a safe commercial basis. The deputy chairman has been fortunate enough to discover a promising enemy in the wasp *Elis atrata*, a black wasp, which burrows into the soil after the grub, stings and paralyzes it, and lays an egg in its body; the egg hatches a small grub which feeds on the larger one until it becomes a perfect insect. The value of this hopeful discovery is not yet realized, for the wasps have probably been destroyed by everybody who saw them, on the supposition that every wasp is an enemy; now its description and uses will be published throughout the island, and its value as a friend of the agriculturist made known. The deputy chairman has this matter in hand for fuller investigation, and the publication of results.

BANANAS AT JAMAICA.

A larger demand than hitherto by competing companies, together with the severe drought which has thrown back the fruiting of plants, caused a good trade in bananas all through the year, with a decided scarcity later, resulting in high prices, which enabled the most remote parts to market their fruit with profit. There has been a large increase in exports from 11,148,708 stems to a total of 14,660,582 stems, the great bulk of which, of course, has gone to the United States; but there has been a fair increase of 283,973 stems, making a total of 1,004,188 stems to the United Kingdom, and to Canada, an increase of 108,260 stems to a total of 120,868 stems, with a further supply of between 600,000 and 700,000 stems, estimated as going to Canada, *via* the United States. (*Report of the Jamaica Agricultural Society*, 1902-3.)

ROSES IN JAMAICA.

In the May number of the *Journal of the Jamaica Agricultural Society*, there is an article on the growing of Roses, by Mr. H. H. Cousins, the Government Analytical and Agricultural Chemist, who is also an ardent gardener.

Mr. Cousins' notes are based upon experiments made in his garden near Kingston, at an elevation of about 400 feet. The writer gives directions as to choice of site, the making of beds and planting. In regard to the purchase of plants, Mr. Cousins recommends the Good and Reese Company, Springfield, Ohio, U.S.A., for standard sorts at cheap rates, and the Dingee and Conard Company, for high class roses. Hundreds of parcels containing roses are annually imported into Jamaica from the States. In regard to packing, there must be a plentiful supply of air, and the roots must be kept moist. The plants should be nursed in the shade, in bamboo pots, for a month or six weeks before being planted out.

With reference to the plants suited to Jamaica, Mr. Cousins says, 'The only plants that can be recommended for growth in the tropics are roses *on their own roots*.

'It is possible that a suitable stock for budding in the tropics might readily be found; but it is not desirable, except for a few delicate varieties that fail on their own roots, owing to the extraordinary vigour displayed by the most desirable varieties when grown as cuttings.'

In the next issue of the *Agricultural News* we shall give a list of the varieties which Mr. Cousins considers the best for Jamaica.

ODDITIES IN BANANAS.

Very occasionally there are peculiarities observed in the growth of bananas, especially as regard the fruit. In Fig. 15, there is illustrated an instance where the fruit, of a Sugar banana at Trinidad, in 1895, instead of coming out as usual at the top, amongst the leaves, had forced its way out at the side of the stem a few feet above ground (*Trinidad Bulletin*, 1895, p. 33). Mr. Hart was of opinion that this was due to the fact that there was a slit in the leaf sheaths at that point. The flower buds had, therefore, forced themselves through at the point of least resistance. The bunch of fruit, in spite of this abnormal exit, was fairly well developed.

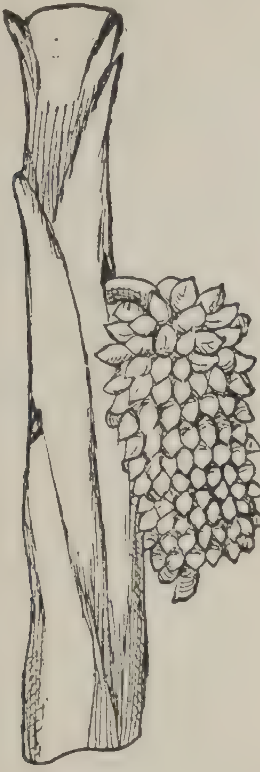

Fig. 15.

Bananas with fruit produced low down on the side of the stem.

In Fig. 16, there is shown (also from Trinidad) a Governor fig or Chinese banana with two bunches, appearing on opposite sides of the same plant (*Trinidad Bulletin*, 1903, p. 554). One bunch had five hands with 59 fingers, the other six hands with 64 fingers. On the stem being dissected, it was found that this was a case of a twin stem, each producing its own bunch of fruits.

It would be interesting to observe whether any suckers from the same stool would produce similar twin stems. It is unlikely that a form of banana with twin stems, if established, would prove remunerative. A large single bunch is always worth more commercially than two small ones. A plantain with two bunches of fruit of large size was observed by Sir D. Morris at Jamaica in 1884.

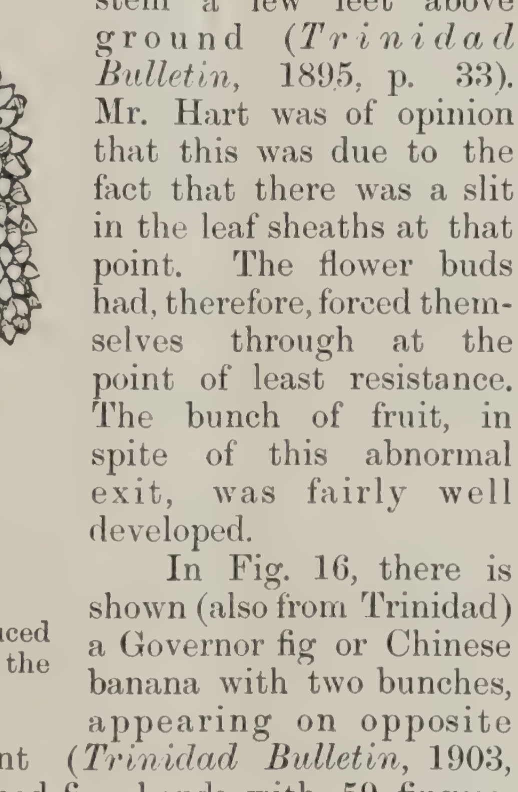

Fig. 16.

Chinese banana with double bunch of fruit.

In Fig. 17, there is shown an abnormal development in the flowering stem of a plantain from Bombay. In this case we have, first of all, a double stem appearing from amongst the leaves. Each one produces its own separate cluster of flowers and immediately after divides, so that ultimately four distinct flower clusters are produced on the one plant. This may be a case of dichotomous branching. Similar divisions of the stem take place commonly in the Doum palm, Dracaenas, Aloes and other monocotyledonous plants. It is apparently rare in Musas or the banana family.

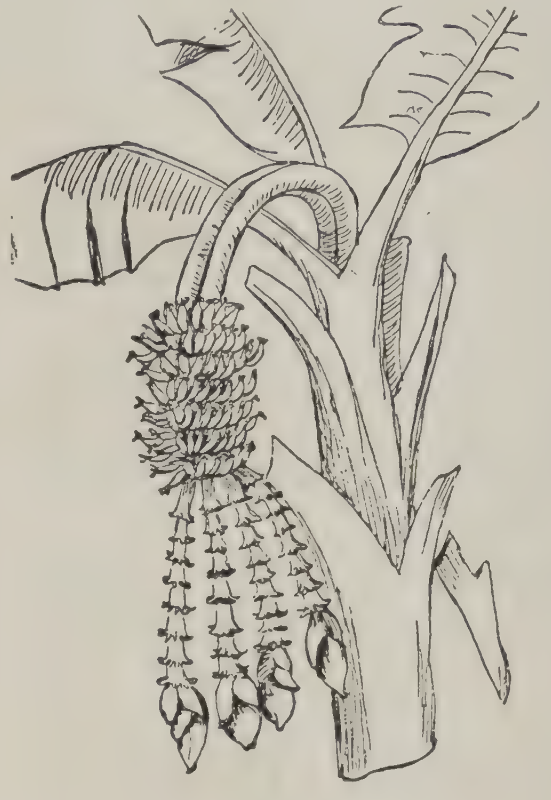

Fig. 17.

Plantain with four tassels of flowers.

THE BOTANIC GARDENS IN BRITISH GUIANA.

The Demerara *Argosy* has been publishing a series of articles by Mr. James Rodway, F.L.S., under the heading of 'The Story of Georgetown.' The concluding article deals with the Botanic Gardens as follows :—

In 1877, a committee of the Royal Agricultural and Commercial Society was formed to draw up a memorial setting forth the benefits likely to arise from the establishment of a Botanical garden. As a result of this movement, land was bought by the government at Vlissengen and 185 acres were handed over for the gardens. Two years later, Mr. J. F. Waby commenced to lay out the land. In 1880, Mr. G. S. Jenman arrived to take charge as Botanist and Superintendent of the gardens. Seedlings of a large number of ornamental and shade trees were raised for street planting.

Mr. Jenman's main idea seems to have been to establish an ideal wild garden, where there would be an interesting zoological collection. After Mr. Jenman's death in 1901, the gardens underwent a great change as a result of the draining of the land and the clearing away of much of the vegetation. Mention is also made of the good work being carried on by Professor Harrison and Mr. Ward in the raising of sugar-cane seedlings.

Corn at St. Kitt's. We have received through Mr. Lunt, the Curator of the Botanic Station, St. Kitt's-Nevis, a report by Mr. A. D. C. Adamson, upon the results of experiments with varieties of improved corn originally obtained from Antigua. The land was not specially prepared for corn; the seeds were planted between rows of sugar-cane. The three varieties experimented with yielded $182\frac{1}{4}$ ℔., $144\frac{1}{2}$ ℔., and $154\frac{1}{2}$ ℔. respectively, on one-fifth of an acre.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 255 of this issue.

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Agricultural News

VOL. II. SATURDAY, AUGUST 1, 1903. No. 34.

NOTES AND COMMENTS.

British Cotton Growing Association.

The Secretary of the British Cotton Growing Association desires that an announcement be made in the *Agricultural News*, that it is impossible for him to attend to the numerous correspondents who write to him from the West Indies. He requests that all communications relating to cotton growing in the West Indies be sent to him through the Imperial Commissioner of Agriculture or the Chief Executive Officer in each island. He adds 'it is quite impossible for us here to attend to the numerous letters which reach us.'

Rubber in British Guiana.

A sample of rubber derived from native trees, received from British Guiana by the Department for a report and valuation, was submitted by the Imperial Commissioner of Agriculture to the Editor of the *India Rubber Journal*, London, and *India Rubber World*, U.S.A. The sample was reported as being a good, marketable rubber and well worth gathering. At present prices it is quoted as being worth about 65c. per lb. This price is a little less than good Columbian white scrap rubber.

There is little doubt that, if the rubber could be prepared more carefully, and made stronger and cleaner, its market value might be considerably improved.

Minor Industries at Antigua.

Sugar has hitherto been the staple industry at Antigua and little has been exported from that island except sugar and molasses. There are, however, signs that other industries are gradually being established. In the Report recently issued on Agricultural Experiments carried on by the Hon'ble Francis Watts and Mr. Sands, it is stated that during the year ended March 31, 1903, the following produce, other than sugar, was exported:—

Onions: 728 crates (about 36,400lb), valued at £182. This is in addition to a large quantity used for local consumption.

Pine-Apples: 4,754 barrels and 47 crates, valued at £2,280 15s.

Lime Juice: 99 casks, raw, valued at £116 15s., and 6 casks, concentrated, valued at £25.

Tamarinds: 1,902 barrels, valued at £1,042.

Divi-divi: 41 bags, valued at £10. Divi-divi is the name given to the pods of the Divi-divi tree *(Caesalpinia coriaria)*, which are used for tanning purposes.

Cassava at Jamaica.

In the *Bulletin of the Department of Agriculture, Jamaica*, for June and July, 1903, Mr. H. H. Cousins M.A., Government Analytical and Agricultural Chemist, gives analyses of a number of selected local varieties of bitter caassava. Six of the varieties were grown at the Hope experiment station and seven were obtained from a property belonging to the Hon. T. H. Sharp, who has for many years taken an active interest in the cassava industry. In the case of the Hope varieties, the starch content varied from 30·7 to 36·3 per cent., the average being 33·1 per cent. The average percentage of starch in the varieties obtained from Mr. Sharp was rather higher, viz. 34·97, two varieties yielding over 39 per cent.

The average of six varieties of sweet cassava, imported from Columbia by Mr. Robert Thompson and grown in Jamaica, was 34·8 per cent. There is, however, a high percentage of prussic acid in the creole varieties, and consequently, the Columbian non-poisonous varieties are undoubtedly superior for food purposes.

Until comparative tests of the yields per acre have been made, it is impossible to say whether there will be any advantage in substituting these new imported varieties for the local cassavas.

The *Annual Report of the Jamaica Agricultural Society* for 1902-3, says:— 'There has been much talk of cassava as a profitable crop (1) by the manufacture of starch, (2) in a dry form as a cattle food. The suitability of our soils and climatic conditions, the richness of the tubers and the large returns per acre, together with the experience and understanding the people already have of it, make the development of a cassava industry less of a speculative enterprise than many, whose possibilities are periodically discussed.

The Balata Industry in British Guiana.

The Demerara *Argosy* of July 8, 1903, welcomes the proposed modifications of the Crown Lands regulations. The most important changes are those affecting the East Indian immigrants and the balata industry. It is now proposed to abolish the restrictions regarding the employment of free East Indians in the interior. With regard to the balata industry, it is the intention of the Government to increase their control by enforcing registration. Further, there are to be new regulations dealing with the bleeding operations, with a view to preventing the killing of the bullet trees. It is proposed to make it illegal to cut any tree whose circumference, at a height of 4 feet from the ground, is less than 36 inches, but allowing mature trees to be cut within three-quarters of their circumference, and these will not again be cut for three years. Under such an arrangement, more milk will be obtained at one cutting and the trees will have a better chance of healing than is the case at present.

Vanilla Culture in Samoa.

An article, entitled 'Vanille-kultur auf Samoa' that appeared in *Der Tropenpflanzer* of May 1903, states that the credit for the introduction of the cultivation of vanilla into Samoa belongs to the French Mission.

The cultivation appears to have met with success upon the fertile, moist lands of the island of Upolu and, while the crop is still a small one, the product appears to be excellent and to fulfil expectations. Naturally, the whole of Upolu is not adapted to vanilla culture; this is the case where there is not sufficient moisture, especially in the neighbourhood of Apia. Northern Upolu, with its abundant rain, and the rainy, southern part of the island are much more suitable for this cultivation. This is specially true of the Safata district, where there are a number of rivers and brooks with flat banks, which render artificial watering of the plants an easy matter. The Safata-Samoa Company intend to plant out the smaller flats in vanilla, following the example of the German Samoa Company. The only disadvantage, in Samoa, is that pollination has to be carried out artificially, as the special insects, adapted to the vanilla flowers, do not occur there.

The prices realized are not so high as those obtained, for example, in Réunion; still the cultivation, if it is rationally carried out, will be profitable and specially recommends itself to small cultivators.

Mosquitoes and Malaria.

In an address delivered on April 27, the Hon. Sir W. Hely-Hutchinson, G.C.M.G., the Governor of Cape Colony, described the result of a trial of a mosquito-proof house in Barotseland. The Evangelical French Church have established a mission about 400 miles north of the Victoria Falls. Of seventeen people who went out to join the mission in 1899, nine have died and eight have been obliged to return to Europe on account of malaria.

In September 1902, a medical man joined the mission; he took with him an iron house, built upon Dr. Ross' plan, with mosquito blinds all round. His Excellency said that he had recently seen a letter from this gentleman, in which he stated that he believed that nine-tenths of the white traders in that district had died or been desperately ill since his arrival. He, himself, and his wife, living in the mosquito-proof house, had not had a touch of fever during the whole time.

This adds further proof, if any were needed, of the transmission of malaria by mosquitoes.

The West Indian Bulletin.

The second part of Volume IV of the *West Indian Bulletin* is issued to-day (August 1). The papers contained in this issue are:— 'Ground Nuts in the West Indies,' 'The Cultivation of Pine-apples,' 'Bay Oil and Bay Rum,' 'Chemical Selection of Sugar-cane,' 'Birds of Barbados,' 'The Culture and Uses of the Species of Eucalyptus,' 'The Treatment of Orchard Soils,' 'Kola Nuts in the West Indies,' and 'Bay Oil and Bay Rum *(continued)*.'

The paper on ground nuts, by Mr. W. G. Freeman, A.R.C.S., B.Sc., F.L.S., late Scientific Assistant to the Imperial Department of Agriculture, gives an account of the methods of cultivation of this crop in the West Indies, the uses to which the various products of the nut are put, and suggests an extension of the area, at present under ground nuts. The paper on the cultivation of pine-apples gives notes on the soil requirements of this plant, the best methods of preparing the land, propagation, planting, cultivation, etc. The paper was first read by Mr. Charles Eugene Smith at the Mico Training College, Kingston, Jamaica, so that the notes are adapted to West Indian conditions.

The papers on Bay oil and Bay rum give notes on the botanical question of the differences between the true Bay tree and its allies, and, further, on the preparation and uses of Bay oil and Bay rum in the West Indies and elsewhere. The notes on chemical selection of the sugar-cane give the results of some experiments, carried out by the Hon'ble Francis Watts, Government Analytical and Agricultural Chemist for the Leeward Islands, to test how far it is possible to improve the saccharine qualities of the sugar-cane by a process of chemical selection.

The paper on the birds of Barbados gives an account of the destruction of the native birds which is going on in that island, and suggests measures to stop this. The paper on Eucalypts consists of two parts; the first part gives a general account, taken from a bulletin of the United States Department of Agriculture, of the culture and uses of the different species of *Eucalyptus*; the second part gives an account of the Eucalypts at present cultivated in the West Indies.

The paper on the treatment of orchard soils is a contribution to the debate as to whether thorough surface cultivation or no cultivation, except the occasional cutting back of rank weeds with a cutlass, is the better method of treatment. The note on kola nuts deals with the question of the best varieties of kola, and shows the present position of affairs with regard to this point, in the West Indies.

INSECT NOTES.

Montserrat.

The following notes on the economic insects of Montserrat are taken from Mr. Ballou's report on his visit to that island in April last:—

The lime trees seemed to be suffering from the attack of scale insects and long continued dry weather. The insects which were most common and injurious were the Orange Snow scale *(Chionaspis citri)*, the Mussel scale *(Mytilaspis citricola)* and *Aspidiotus* sp., while several others were found, among them the Wax scales *(Ceroplastes cirripediformis* and *C. floridensis)*.

I was unable to obtain specimens of the Onion Moth, which was out of season, but it is reported to be a serious pest, having done considerable damage during the past season.

Cotton has been quite free from insect injury this past year, but both the Red Bug or Cotton Stainer and the Cotton Worm *(Aletia argillacea)* are reported to be present. The former is said to do little damage in the field, but if caught in the gin and crushed, it produces a bad stain in the cotton.

The caterpillar in the crown of the corn plant has done some damage, but has not been so serious a pest as in Antigua. The only remedy, so far tried for this insect, is the use of dry soil or ashes, dusted into the crown of the plant.

A large weevil was found on the tips of the branches of lime and grape fruit. It appeared to eat the tender leaves and was doing considerable damage. This insect could probably be kept in check by spraying with some arsenical poison, such as Paris green.

Ticks on cattle are not a serious pest in Montserrat. In some parts of the island the bark of the root of a plant called dogwood is used, pounded up in water, as a wash for ticks, and is said to be very effective.

The plants at the Grove experiment station are very free from insects. A few of the plants in the nursery show the presence of scales, on careful examination, but they are kept well in check by frequent sprayings. The spraying outfit of the Grove experiment station consists of two knapsack sprayers.

A few lime trees at the Grove experiment station show, distinctly, the good effects of spraying. They are in a hedge and are quite free from scale insects, while there are infested trees in the next field, only a few feet away, and to windward.

Cutting out Dead Hearts.

The moth-borer, although not so abundant as in some previous years, is still a serious pest at Barbados and many planters have been to considerable expense in cutting out 'dead hearts.' Next to collecting the eggs this is one of the best practices to be followed in dealing with this cryptic enemy of the sugar-cane. It has been observed in some cases, recently, that the cutting out has been somewhat carelessly done by the work-people, who have cut the plants above the point where the borer is situated, thus leaving it to complete its development and to emerge later on, to continue its work of destruction. When this happens the time spent in cutting out 'dead hearts' is more than wasted, for not only is the caterpillar allowed to develop to the winged state, but the planter is lulled into a false sense of security with regard to the value of cutting out 'dead hearts,' through the carelessness of his work people. This is a subject it is needless to dwell upon. If 'dead hearts' are not cut low enough, to include and carry away the grub of the moth-borer, time and energy are wasted and the canes will continue to suffer as badly as ever.

COTTON.

The Supply of Cotton.

The following remarks on the cotton industry are taken from *Dun's Review*:—

Cotton has become the prominent feature of the great agricultural staples, and as to violent flunctuation as well as strength of statistical position, there is no disputing the fact that cotton is again king. Visibly, supplies are unquestionably lower than at the corresponding date in any year since the crop has been of sufficient size to make comparisons instructive. This makes it possible for a strong interest to control the stocks so completely that prices may be manipulated readily, and recent returns of exported cotton from Liverpool for delivery on short sales show the pressure to which speculators have been subjected. Spinners are not seeking raw material at 11c. or more, when it is not possible to obtain a commensurate advance in cotton goods. The relation between middling uplands and print cloths may be briefly stated thus. Some years ago, when raw cotton sold at 7½c. per lb., it was estimated that print cloths then selling at 3c. a yard returned a fair profit to the mills. Since that time, every cost of production has advanced sharply, especially labour and fuel. Yet print cloths are dull at 3⅛c., while middling uplands has risen above 12c.

Central Cotton Factory.

The first Central Cotton Factory at Barbados was opened yesterday by Lady Morris. The building, 100 feet long and 26 feet wide, is placed at the eastern end of the pier at Bridgetown. It is fitted with an engine and boiler, and with a double-action Macarthy ginning machine and a baling press presented by the British Cotton Growing Association. It is proposed to obtain two more similar ginning machines from England. When these arrive the factory will be capable of dealing with about 3,600 lb. of seed-cotton per day.

INQUIRIES.

Ants and Bees.

The Agricultural Instructor at Tortola writes in regard to bee-keeping in that island as follows:—

We have been greatly troubled with ants. On this account I have had a stand erected for the hives, the legs of which are surrounded with liquid tar. I hope this will keep ants away. I should like to know whether other West Indian bee-keepers have suffered from the same cause, and if so, what remedies have been found successful.

EDUCATIONAL.

The St. Lucia Agricultural School.

The following is an extract from an account of a visit to St. Lucia made by Mr. J. Gordon Bennett of New York:—

The Agricultural School of St. Lucia, situated about four miles from Castries, is a most interesting place to visit. Under the expert direction of Mr. John C. Moore, as Superintendent, the school is advancing at a rapid rate. The station is placed on high, rolling ground, fertile and well watered. Substantial buildings house the twenty pupils now under instruction. Week-day regulations of hours of labour, study and recreation are posted in the rooms, showing that careful attention has been given to all the details of the work. The cleanliness of the buildings, the smartness in the appearance of the boys and the excellence of the showing of the individual gardens cared for by the pupils, mark a success creditable to all who have undertaken the work of uplifting the agricultural interests of the colony.

It may be added that exactly similar schools are being maintained, out of the funds of the Imperial Department of Agriculture, at St. Vincent and Dominica.

Educational Work of the United States Department of Agriculture.

The following extract from *Report No. 73* of the Hon'ble James Wilson, the Secretary of Agriculture in the United States, should be interesting to agriculturists and students of Agricultural Science in the West Indies, as showing the progress of the work and range of research carried on by the United States Department in connexion with agriculture:—

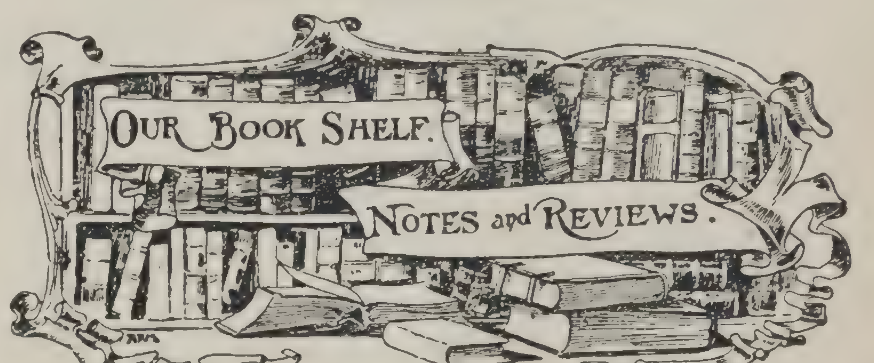
The educational work of the Department of Agriculture has grown in effectiveness since my last Annual Report. The opportunities offered to young men to fit themselves for special lines of experimental work, under the immediate care of our most experienced scientists, are being sought by greater numbers every year. The influence of the Department is extending through co-operation with the scientists of the experiment stations of the several States and Territories and the isles of the sea under our flag. The demands of these institutions for trained men to conduct research into so many fields of inquiry, and of private individuals and companies for the best organizing and supervising ability to manage agricultural enterprises, encourage students to prepare for doing this work.

The teaching of the science of agriculture and the sciences related to it is receiving more attention in the colleges instituted for this purpose, many of which in the past have neglected their full duty in this respect.

Research by the Department officials into the principles governing the growth of plants and the creation of new species by hybridizing to give varieties from which to select for new purposes has brought gratifying results. We have new fruits and grains of numerous kinds adapted to localities that have been needing them for many years.

We are helping people in many localities to an intelligent knowledge of their soils, and of the most profitable uses to which they may be devoted. Results are showing the value of this service. The best sugar lands, rice lands, tobacco lands, truck lands, and lands best adapted to particular fruits, grains, grasses, legumes, and other crops are being discovered, as certainly as any other unknown thing is brought to human knowledge for the first time.

Few of the plants of most value to our people are native to the United States. They are products of other countries and have been useful in their localities for long periods of time. Our various soils and climates are adapted to many things that have not yet been introduced to them. Department explorers are searching the Old World for whatever is valuable there and useful here, with results that are quite encouraging. Our aims are to help toward the production in the States and Territories of everything their soils and climates will permit, and to help our new island possessions to grow whatever products require tropical conditions.


Our Book Shelf.
Notes and Reviews.

BRITISH GUIANA: GENERAL INFORMATION WITH REGARD TO THE GOLD, DIAMOND AND FOREST INDUSTRIES. Issued by the Government of British Guiana.

This little hand-book has been published upon the suggestion of the Secretary of State, with a view to answering the inquiries frequently addressed to the Colonial Office with regard to the mineral and forest resources of the colony.

The introduction deals with the prospects of intending colonists and the purchase of land. Statistics are given of the trade in balata, timber, gold and precious stones.

Full information is also given for intending colonists with reference to the mineral resources, mining laws, geology, etc.

A valuable feature of the hand-book is the list given in Appendix II, of the colony woods in the collection at the Institute of Mines and Forests.

The catalogue contains particulars of sixty-seven woods, and is compiled principally from the descriptive notes by Mr. M. McTurk, C.M.G., in section C. of the special catalogue of exhibits in the British Guiana Court at the Colonial and Indian Exhibition, 1886, and from the Report on the 'Results of Technical tests applied to a series of Timbers,' by Mr. Herbert Stone, F.L.S., 1901. In most cases a description of the wood, its specific gravity and log measurements are given. There is also information as to their use, strength and durability. Many of the notes in this appendix will be found useful to persons in other parts of the West Indies.

Journal d' Agriculture Tropicale. We have to acknowledge the receipt of the latest number of this useful and enterprising journal, dealing with the cultivation of tropical crops. The *Journal d' Agriculture Tropicale* is published, in Paris, by M. Vilbouchevitch, 10, rue Delambre, who will be pleased to receive orders for the journal. We take pleasure in acknowledging our indebtedness to M. Vilbouchevitch for making known the *Agricultural News* to residents in the French West Indies.

REARING OF DUCKS.

In his present article Mr. Barclay deals with the question of breeding ducks:—

I repeat what I have stated about the difference between Muscovy ducks and all the other varieties mentioned,—the Aylesbury, Pekin, Rouen, Indian Runner—the Muscovy is a different species, just as different as a horse is from an ass, and crosses between a Muscovy and any of these varieties result in mules. The cross-breeds make good birds for the table and good layers, but the eggs do not hatch. It is not impossible that they hatch, but I have never known them to be fertile. That great authority, Mr. W. Cook of Orpington fame, says the eggs of the cross-breeds do hatch, and he has known them to do so. Muscovy eggs take five weeks to hatch, the ordinary duck eggs, four weeks. To note these differences in the Muscovy duck prevents confusion. One drake can be mated with eight or ten ducks, but the Muscovy drake is the only one that will interest himself in nest making and the rearing of a brood, and this he will only do when there is one duck with him. The Muscovy duck has the good point, like hens, of making a nest for herself and laying there, if she is given the opportunity and encouraged to do so; but all the other kinds of ducks, having the original strong setting tendencies to some degree bred out of them, will drop their eggs anywhere. It is thus necessary to keep them penned up at night, not letting them out until they have laid, which, as I have said, is usually early in the morning. The Muscovy duck may set on her own eggs whenever she has laid her quota, for it is difficult to break this breed of their setting fever, and moreover, she would take such a long time to lay again that it would make little difference. The eggs of the other ducks should be set under large broody hens, or in an incubator. The nest should be made in a quiet corner, and in the same manner as described for hens.

I have often had complaints that duck eggs set under hens did not hatch as well as they did under ducks. This is quite true, but a close study of nature will soon show the reason. A duck always returns to her nest wet, for if she cannot find enough water to swim in, she will throw water over her plumage in making her toilet. It is necessary, therefore, to sprinkle daily with water duck eggs set under a hen (or in a dry climate where there is no pond for the ducks to swim in, eggs set under a duck). This should be done very freely the last two weeks, otherwise the dry heat causes the skin tissue under the shell to dry up like parchment, so that the duckling cannot make its way out when ready to hatch, and becomes suffocated.

When the ducklings appear, leave them alone for at least twenty-four hours, and it will do them no harm to get no food until even after forty-eight hours. Then some corn-meal or wheat-middlings should be mixed with water into a paste and given to the ducklings in a shallow dish; or, to keep to native foods, boiled rice in the paddy, or rice and rice-bran together steamed, boiled breadfruit mashed into a paste, and ripe bananas and a few boiled peas mashed up together. If a portion of a duck ants nest is placed before them they will soon pick up the soft, oily insects and thrive right away on them. This is an invaluable food for all young domestic birds. The first food young ducks get in nature is the flies and aquatic insects they catch on the water, so animal food of that nature is best. Boiled rice or mashed bananas and a little milk may be given, if they are to be pushed on for the table from the start. After the first week, all that is given to the old ducks may be fed the ducklings, but it is particularly necessary to keep young ducklings from getting at hard grain, especially whole corn. The whitest-fleshed ducks I have ever seen on the table were fed as much of the skimmings from a sugar-mill as they could snatch from a crowd of little pigs, which were also being fed there. It may seem natural for young ducks to go to water to have a swim, but, all the same, if kept from getting wet until their feathers grow, there is general testimony that there will be much mortality saved, although I cannot say that I altogether agree with this. It seems curious that letting ducklings fulfil their natural instinct, to go into water, should prove fatal. I fancy this must be because, afterwards, they get exposed to sun in the day or chill breeze in the evening, both of which on the wet draggled down, tend to make them droopy and sick. In nature, the old duck takes her brood down little shady streams or close along the banks of larger waters or among the rushes and sedges of lakes and marshes. They are seldom exposed much to either breeze or sun and are always getting exercise, while looking for food; whereas the domesticated ducklings receive their food in bulk, and are then inclined to sit lazily about in the sun or breeze. The same rule holds good with ducks as with fowls. Force them to be as active as possible, and by placing grain like corn, peas, or paddy rice in an earth heap, kept damp and soft, and occasionally turning it over, the ducklings will go at it with busy beaks and soon find grains here and there, and as these will be germinating they will be soft, sugary and easily digested. Besides, they will find worms, grubs, beetles, and many creeping things that have been attracted to the heap.

When the ducklings get feathered over the body, they may receive the same treatment as the grown ducks. At two months, the young drakes and ducks, not to be kept for stock, may be put up for fattening. The same food as described under 'Feeding,' does for fattening, with the addition of the flesh of cocoa-nut scraped so as to form a soft paste or meal. If fresh, the cocoa-nut will be soft and pulpy when scraped. This gives the flesh a fine flavour. In the fattening pen, a mistake that is sometimes made is feeding hard, dry food, and not keeping plenty of water before the ducks. It is a little more economical in fattening to follow a slightly different plan than in feeding for growth or eggs, and to give only soft food, and that thick. Abundance of water should be supplied afterwards, so that the ducks will stuff themselves quicker and take all the water they need separately. When put up in a pen, ducks should have a shovel-full of gritty earth supplied them, as, like hens, though in less degree, they need some grit for their proper digestion.

At three months, young ducks of all varieties, except Indian Runners, which are small, should weigh, with good treatment, about 5lb., and those put up to fatten at two months, should, at three months, weigh 6lb. If ducks are meant for table, they should be used under three months old, as from then they drop away in weight, putting forth all effort to finish off their plumage, and may not be used profitably again for table until six months old.

[Correction. In the third line from the end of the article on the 'Rearing of Ducks' in the *Agricultural News*, Vol. II, p. 218, the words 'the Blue Lundisk' should be 'the Blue Swedish.']

DEPARTMENTAL REPORTS

ST. VINCENT: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL AND LAND SETTLEMENT SCHEME, 1902-3.

Botanic Station: Mr. Powell's report deals with the working of the station during the year ended March 31, 1903. No damage was done at the Botanic Station by the volcanic eruptions of the Soufrière. The Curator reports a considerable falling off in the number of economic and other plants distributed, which is attributed to the interference, by the volcanic eruptions, with planting operations. Budded orange trees have been obtained from Jamaica and from the Montserrat Botanic Station. It is reported that the efforts of the Imperial Department of Agriculture to improve the native breeds of live stock are being appreciated. The importations during the year included a Hereford bull from Canada, and a ram and two ewes from Barbados. These animals, as well as the Poland China boar previously introduced, are in good condition and giving satisfaction.

The good work done by Mr. Powell to improve the efficiency of the Botanic gardens is being continued, in spite of the general agricultural depression in the island.

Agricultural School: The report on this school, which is maintained by the Imperial Department of Agriculture, states that there were twenty boys in residence at the close of the year.

The expenditure during the fifteen months from January 1902, to March 31, 1903, was £812. It is estimated that a saving, to the extent of £40, was effected during the period under review, by the growth of vegetables on the experiment plots. These include beans, peas and ground provisions.

Each boy has a plot of his own in which he can work in his spare time, disposing of the produce as he likes.

There is ample evidence in the report that work of a satisfactory character is being carried on by Mr. Knowles and those associated with him.

Land Settlement Scheme: This is the first report of the Agricultural Instructor. For seven months of the period under review, Mr. Osment was engaged on relief work in connexion with the volcanic eruptions.

Reference is made to progress on the settlements at Park Hill, New Adelphi and Lindley Valley. Mr. Osment reports that the refugees have made considerable efforts to clear and plant the lands at Clare Valley and Camden Park estates, lately purchased by the local Government from Relief Funds. A sum of £115 has been expended on the planting of permanent windbreaks.

VIRGIN ISLANDS: ANNUAL REPORT ON THE EXPERIMENT STATION, TORTOLA, 1902-3.

By W. C. Fishlock, Agricultural Instructor.

The expenditure for the year was £636 17*s.* The receipts from the sale of plants, stock, etc., amounted to £20 15*s.* 2*d.*

A considerable amount of labour has been expended in improving the grounds of the station by digging a canal, to protect the lower lands during heavy rains. A large number of ornamental and useful plants have been introduced during the year. An aermotor has also been erected.

Experiments have been carried out with a number of economic plants. Good results were obtained in the case of some of these, but the coffee, cacao and lime plots gave poor results on account of an unfavourable season.

The live stock at the station appear to be doing well.

AGRICULTURAL SHOWS.

St. Vincent.

The St. Vincent *Sentry* discusses the proposal to hold an Agricultural Show in December or January next. The Imperial Commissioner of Agriculture has promised financial assistance for the purpose of providing prizes.

As no show has been held in St. Vincent for many years, considerable interest will, no doubt, be aroused in connexion with the proposal.

The *Sentry* points out the uses of Agricultural Shows in stimulating the peasantry by introducing a spirit of rivalry, and refers to the impetus given to the agriculture of the island by the Imperial Department of Agriculture. The introduction of modern and scientific methods of cultivation is one of the chief aims of the Department, and the value of Agricultural Shows in this connexion is now receiving general recognition.

Jamaica.

The fourth Annual Agricultural Show in connexion with the Port Royal Mountains branch of the Agricultural Society, was held at the Hope Show grounds on July 1.

The show was opened by his Excellency the Governor, to whom an address of welcome was presented. In replying, Sir Augustus Hemming referred to the excellent work that was being done by the Agricultural Society and its branches, in connexion with agricultural shows. There was a good attendance and a large number of exhibits.

The cattle and horsekind were scarcely as good as usual; a result, in part no doubt, of the institution of the Jamaica horse show. The feature of the show, however, was undoubtedly the splendid exhibit of minor products, there being no fewer than 2,500 entries. In this section, the coffee and Irish potatos were particularly fine. Land has been leased at Hope and permanent buildings erected, and as the large sheds set apart for the minor products were completely filled, there is ample indication of real agricultural progress.

British Guiana.

It is evident that his Excellency Sir Alexander Swettenham is most desirous of encouraging minor industries at British Guiana. At the Agricultural Show to be held at Buxton and Friendship on August 10 next, 'special prizes are offered by his Excellency for the best sample of well cured vanilla not less than 10 ℔. ($50); the best collection of good merchantable clean Para rubber not exceeding 112 ℔. ($50); the best sample of the Brazil nuts of commerce ($10); and for the largest and best planted area of cocoa-nuts in the village of Buxton and Friendship, provided such area was planted in the twelve months preceding the Show and not exceeding ten acres ($25); if it exceeds five acres $15. There are also awards for clean cotton, the largest and best cotton cultivation, best-kept kitchen garden, etc.' (*Daily Chronicle*, July 15.)

GLEANINGS.

This season's sugar crop in Cuba is estimated at 975,000 tons, while it is thought possible that it will reach a total of 1,000,000 tons.

Reference is made in the *Louisiana Planter* of June 13, 1903, to a cane cutting machine invented by Mr. Jules Gaussiran. This machine has been very successful in cutting canes.

According to the annual report of the Jamaica Agricultural Society, published in June 1903, there is a good hotel demand for eggs and fowls in that island, during the tourist season.

In the *Louisiana Planter* of June 13, notice is taken of an article in the *Agricultural News* (Vol. II, p. 169) on the arrowing of sugar-cane. In Louisiana, the sugar-cane very rarely arrows, and the writer points out that it is difficult, in that country, to arrive at any conclusion with reference to the question of the proper time for harvesting canes.

The Jamaica *Daily Telegraph* of June 20, mentions that a prize bull came out on the *Port Antonio* on June 19, from England for Mr. H. C. L. Martin of Manchester. The bull was imported through the Agricultural Society. The animal was examined by Dr. J. M. Gibb and was in a healthy condition.

The *Journal of the British Honduras Society of Agriculture and Commerce* for July 1903, contains a short article on 'Hay.' The writer suggests the making of hay from Guinea grass, Para grass and *Paspalum distichum*, and gives directions as to cutting, curing and baling. The article concludes :— 'An acre of well-established Guinea grass should yield four crops per annum of about 20 tons of dried fodder. Para grass is probably even more profitable.'

A recent number of the *Plant World* has a paper by Mr. William Palmer on the uses of the Cuban royal palm *(Oreodoxa regia)*. The wood is used for fence posts and as supports for houses. From the leaf-stalks various fancy articles are made, such as boxes and baskets. The large flower-stalk is tied up so as to form a broom, which is a common article in Cuban houses. For food purposes, the berries are given to poultry or pigs, while the mass of embryo leaves is eaten as a vegetable.

According to the Jamaica *Gleaner* of July 8, 1903, the Costa Rica banana trade is increasing rapidly. The number of bunches exported during 1902 is given as 4,174,199 ; in 1901 the number was 3,870,156, and in 1895, it was only 1,585,817. Of the bunches exported during 1902, 2,307,391 were sent to New Orleans, 1,081,834 to New York, while only 16,483 went to England.

According to the Demerara *Daily Chronicle*, July 15, 20,825 ℔. of balata won on Venezuelan soil, were shipped to Georgetown during the month of June.

The St. Croix *Avis* is publishing a series of articles on 'Tropical tobacco growing.' In these articles the author has dealt with the history, planting, cultivation and gathering of tobacco ; directions are also given for drying and curing.

The pine-apple season in New York is closing. The crop in the Bahamas was short this year owing to the long drought, the total receipts being of the value of £5,000. Florida growers made experimental shipments direct to Europe this year. The attempt was successful. The fruit arrived in good condition and sold well.

Speaking of the cotton gin, recently imported into St. Lucia by the Agricultural Society (*Agricultural News*: Vol. II, p. 170), Mr. Hudson, the Agricultural Instructor, says that Mr. Barnard estimates the clean cotton passing through the gin this year at about 3,500 ℔. This is not, however, the entire crop, as small quantities are continually being cleaned by hand.

According to the *West India Committee Circular*, efforts have been made to bring more closely before the notice of the people of the United Kingdom the products of the West Indian colonies. With a view to stimulate this movement, permission has now been obtained for the exhibition of West Indian produce at the temporary City Inquiry Office of the Commercial Intelligence Branch of the Board of Trade, 49, Eastcheap, E.C. Members of the West Indian Committee are requested to forward, without delay, such articles as they may wish to exhibit.

At a recent meeting of the Jamaica Agricultural Society, the Hon'ble Sydney Olivier, C.M.G., moved a resolution, which was adopted, 'That permanent arrangements be made for maintaining exhibits of non-perishable products at the Annual Canadian Exhibitions and that the Secretary of the Society be empowered to obtain and forward such exhibits.'

On the motion of Dr. Pringle, C.M.G., it was decided to ask the Government to provide a sum, not exceeding £50, for sending Jamaica products to the Canadian Exhibitions.

The Board of Agriculture of British Guiana has instituted a competition among the market-gardeners and farmers of the Georgetown district. The sum of $120 is being offered in prizes. Intending competitors were to forward their names and the situation of their gardens or farms to Mr. R. Ward, Instructor in Agriculture, before July 31. The gardens and farms will be subject to periodical inspections during the months of August, September and October. The adjudication of the awards will take place towards the end of October next.

According to the *Indian Planters' Gazette* there are about six chief varieties of sugar-cane grown in Bengal. The best known varieties being the 'red' and 'white,' others like the 'Bombay' and the 'China' are also popular in certain districts. Sugar-cane is grown in Bengal on all kinds of soil, but the land receives thorough ploughing, usually being taken in hand six or eight months before the planting season. The soil also receives heavy applications of natural and artificial manures. The profits are rarely less than 150 rupees (about £10) per acre.

ST. VINCENT.

Experiments in Volcanic Ash.

In the *Agricultural News* (Vol. I, p. 83) an account was given of experiments in course of being carried out at the Experiment Station at Georgetown. This is on the Windward coast of St. Vincent and within the area devastated by volcanic eruptions. The object in view was to test the possibility of resuming the cultivation of certain crops either in the volcanic ash alone, or in a mixture of volcanic ash and the original soil.

Almost immediately after the experiments were started, the reoccurred another eruption of the Soufrière, viz: on March 22, 1903. The effects of this are described in the *Agricultural News* (Vol. II, p. 190).

The following interesting account, describing the present condition of the experiments, has been received from Mr. Henry Powell, the officer-in-charge, of the station under the Imperial Commissioner of Agriculture.

It will be observed that in the case of all crops, the results of cultivation in volcanic ash alone are disappointing; but where the volcanic ash, especially that of May 6, 1902, is mixed with the original soil, the crops are of a distinctly promising character. This is an important point as affecting the future of the Georgetown district; provided, of course, there are no further eruptions.

Mr. Powell entertains a hopeful view of the agricultural prospects of this district, if the soil is suitably dealt with. He supports the recommendation made by the Department that trenches be opened through the volcanic ash to reach the underlying soil, and that a certain proportion of ash be mixed with the soil for the growth of crops. Later, when the ash has become decomposed and gradually incorporated with the soil, it is probable that large tracts on the lower slopes of the Windward coast of St. Vincent may again be brought under cultivation.

In the southern portions of the island, where little or no ash has fallen, agricultural efforts, especially in the case of cotton, are being vigorously pushed forward.

Mr. Powell's letter addressed to the Imperial Commissioner of Agriculture is as follows:—

St. Vincent, July 17, 1903.

I have the honour to report that I inspected the Georgetown Experiment Station on the 11th. instant and was very pleased with the remarkable improvements of the Station generally since my visit immediately after the eruption on March 22 last.

The experiments, started in the early part of the current year, have now quite recovered from the damaging effects of the eruption referred to above and are in vigorous and healthy growth.

Sugar-canes: The three sets of experiments show plenty of vigour, but those planted in old soil and May ejecta mixed have the strongest growth.

Ground Nuts: The bearing qualities of each of the three plots are very promising as regards the number of 'nuts,' and but for the eruption of March, the crops would have been already reaped; as it is, the nuts generally will not mature till six weeks or two months hence. As far as can be ascertained up to the present, the largest number of perfect 'nuts' are produced in the old soil and May ejecta mixed; those growing in the May ejecta and October ejecta mixed (that is, in volcanic ash only) are largely 'false' or blackened and decaying as though baked or 'forced ripe.'

This is the general experience in the Georgetown district. All agree, however, that another season when the old soil and ejecta have been mixed extra large crops of ground nuts will be obtained. As far south as North Union the growth and yield of ground nuts are more pronounced than in past seasons, and this is attributed to the 'dust' from the Soufrière.

Arrowroot: So far there is little to choose as regards the growth in the three sections, and the results can only be obtained when the crop is reaped towards the end of the year.

Sweet Potatos: These flourish in old soil and May ejecta mixed and produce fine, sound potatos. In the October and May ejecta mixed, the 'vines' are vigorous and rambling, but do not 'hitch' freely, and in consequence, the potatos are few in number and attenuated in size.

Cotton: The plants under trial are of the 'Peruvian' type. They were almost killed outright in March, but have now recovered, and the growth is promising.

The collection of bananas is in good health and vigour and produce fair-sized bunches.

Nursery: In the early part of this year a large stock of cacao plants was being raised in bamboo pots to supply allottees at Park Hill, etc. These tender plants were severely damaged, but several hundreds have recovered and are being distributed as intended.

Hedges: The Hibiscus has proved much hardier, as regards eruptions than galba. The latter was totally destroyed.

Barbed wire fence: The live hog plum and turpentine posts are being supplied where necessary, but very few were killed outright by either of the eruptions.

Guango or Rain tree: A good percentage was killed outright. Those left are now in rapid growth.

I have now a very hopeful view of the agricultural prospects of the Georgetown District; and even north of Mount Bentinck the country has greatly improved in appearance recently.

The success already attained in connexion with the experiments reviewed above as well as the fine growth of a field of No. 95 sugar-cane at Mount Bentinck have strengthened my opinion in favour of a mixture of old soil and May ejecta.

The Soufrière has been quiet for some time, and should it remain so, confidence will gradually be restored in the Georgetown District and as far as practicable, in the absence of the 'canal,' it will extend even further northwards. The rainfall since the 7th. instant is 8·60 inches.

DEPARTMENT NEWS.

On the recommendation of the Imperial Commissioner of Agriculture for the West Indies, the Secretary of State for the Colonies has approved of the appointment of Mr. William R. Buttenshaw, M.A., B.Sc., Lecturer in Agriculture at Jamaica, to be Scientific Assistant on the Staff of the Imperial Department of Agriculture to date from July 14, 1903.

The Hon'ble Francis Watts, B.Sc., F.I.C., F.C.S., who has been engaged in England, since April last, in connexion with a scheme for a Central Sugar Factory at Antigua will probably embark for the West Indies on August 5 next.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—July 7, 1903.—Messrs. Kearton Piper & Co., Messrs. Hales Caird & Co., Messrs. E. A. de Pass & Co., 'The Public Ledger,' July 4, 1903, and 'The Weekly Cotton Circular,' June 25, 1903.

Aloes—Curaçoa, 14/6 to 30/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, $1\frac{7}{8}$*d.* to 4*d.* per ℔.
Bee's-wax—£7 17*s.* 6*d.* to £8 5*s.* per cwt.
Cacao—T'dad, 58/- to 67/- per cwt. ; Jamaica, 52/- per cwt. ; Grenada, 50/- to 58/6 per cwt. ; Dominica, 50/- to 52/- per cwt.
Cardamoms—Mysore, 1/4 to 3/- per ℔.
Coffee—Jamaica, 33/- to 55/- per cwt.
Cotton—West Indian, $6\frac{5}{16}$*d.* to $6\frac{5}{8}$*d.* per ℔.
Fruit—
  Bananas—3/6 to 7/- per bunch.
  Oranges—No quotations.
  Pines—Antiguas, 10/- to 14/- per barrel.
Fustic—Dull.
Ginger—38/- to 65/- per cwt.
Honey—Jamaica, 18/- to 21/6 per cwt.
Isinglass—West Indian, 1/6 to 2/7 per ℔.
Kola Nuts—1*d.* to 4*d.* per ℔.
Lime Juice—Raw, 1*s.* 1*d.* to 1*s.* 3*d.* per gallon. Concentrated, £15 per pipe.
Logwood—No quotations.
Mace—1/9 to 2/4 per ℔.
Nitrate of Soda—Agricultural, £9 10*s.* per ton.
Nutmegs—70'*s* to 75'*s*, 1/5 to 1/7 ; 80'*s* to 90'*s*, 1/- to 1/3 per ℔.
Pimento—$2\frac{1}{4}$*d.* to $2\frac{1}{2}$*d.* per ℔.
Rum—Demerara, $8\frac{1}{2}$*d.* to 10*d.* per proof gallon. Jamaica, 1/6 to 8/- per proof gallon.
Sugar—Muscovado, 11/- to 12/6 ; Crystallized, 14/6 to 15/6 per cwt.
Sulphate of Ammonia—£12 15*s.* to £12 17*s.* 6*d.* per ton.
Tamarinds—Barbados, 11/6 per cwt. ; Antiguas, 7/6 per cwt.

New York,—June 26, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, $1·15 to $1·20 ; eight hands, 90c. ; seven hands, 60c. per bunch.
Cacao—African, $11\frac{3}{4}$c. to 12c. ; Caracas, $12\frac{3}{4}$c. to $13\frac{1}{4}$c. ; Jamaica, 10c. to $11\frac{1}{2}$c. ; Grenada, 12c. to $12\frac{1}{2}$c. ; Trinidad, 12c. to $13\frac{1}{4}$c. per ℔.
Cocoa-nuts—Trinidads, $16·00 to $17·00 ; Jamaicas, $18·00 to $19·00 per M.
Coffee—Jamaica, ordinary to good ordinary, 5c. to $5\frac{3}{4}$c. per ℔. ; Manchester grades, 8c. to 10c. per ℔.
Ginger—Jamaica, $7\frac{1}{2}$c. to $8\frac{1}{4}$c. per ℔.
Pimento—$4\frac{3}{4}$c. per ℔.
Rubber—Nicaragua scrap, 68c. to $68\frac{1}{2}$c. per ℔. ; Guayaquil strip, 61c. to 62c.
Sugar—Muscovados, 89°, $3\frac{1}{8}$c per ℔. ; Centrifugals, 96°, $3\frac{5}{8}$c. ; Molasses, 89°, $2\frac{29}{32}$c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—July 18, 1903.—Messrs. T. S. Garraway & Co. and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4·00 per 100 ℔.
Cacao—$12·50 per 100 ℔.
Cocoa-nuts—$10·00 per M. (Husked Nuts).
Coffee—Jamaica and ordinary Rio, $8·00 to $8·50 per 100 ℔.
Hay—New Brunswick, $1·00 per 100 ℔.
Manures—Nitrate of Soda $57·00 ; Ohlendorff's Dissolved Guano $60·00 ; Sulphate of Ammonia $76·00 ; Sulphate of Potash $67·00 per ton.
Molasses—18c. per gallon, and $4·00 for puncheon.
Onions—Madeira, $2·25 per 100 ℔.
Potatos, English—$1·89 to $2·80 per 100 ℔.
Rice—Ballam, $4·60 per bag (190 ℔.) ; Patna, $3·50 per 100 ℔. ; Rangoon, $2·80 per 100 ℔.
Sugar—In hogsheads. $1·30 per 100 ℔., and $5·00 for hhd. In bags, $1·55 per 100 ℔.

British Guiana,—July 16, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $9·50 to $10·00 per barrel.
Cacao—Native, 11c. to 12c. per ℔.
Cassava Starch—$9 00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, $10\frac{3}{4}$c. to 11c. per ℔. (retail).
—Creole, 11c. to 12c. per ℔.
Dhal—$3·15 to $3·25 per bag of 168 ℔.
Eddoes—$1·68 per barrel.
Molasses—Vacuum Pan, yellow, 16c. per gallon, casks included.
Onions—$1\frac{1}{4}$c. to 2c. per ℔.
Pea Nuts—Curaçoa, $3\frac{3}{4}$c. ; American, 5c per ℔. (retail).
Pigs—Young Boars and Sows, $5·00 each.
Plantains—24c. to 40c per bunch.
Potatos, English—$3·50 to $4·50 per barrel.
Rice—Ballam, $4·70 ex store ; Patna and Seeta, $5·60 to $5·75 per bag.
Creole Rice, 20c. per gallon (retail).
Sweet Potatos—Barbados, 96c. per barrel.
Tannias—$1·92 per bag.
Yams—$2·40 per bag.
Sugar—Dark Crystals, $1·80 to $1·82 ; Yellow, $2·25 to $2·40 ; Molasses, $1·70 to $1·90 per 100 ℔.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—July 16, 1903.—Messrs. Gordon Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Venezuelan, 41c. per ℔.
Cacao—Ordinary, $11·75 to $12·00 ; Estates, $12·75 per fanega.
Coffee—6c. per ℔.
Onions—$1·90 to $2·00 per 100 ℔.
Potatos, English—$1·80 per 100 ℔.
Rice—Yellow, $4·20 to $4·35 ; White Table, $5·50 to $5·80 per bag.
Sugar—White Crystals $3·25 ; Yellow Crystals for local consumption, $2·10 to $2·25 per 100 ℔.
—Molasses sugar, $1·80 to $2·00 per 100 ℔.

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(3) Seedling and other Canes, at Barbados, 1900. Price 2d. Post free, 2½*d*.
(5) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d*. Post free, 4½*d*.
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COTTON.

A special pamphlet (foolscap size), entitled 'Information relating to Cotton Cultivation in the West Indies,' has recently been issued. It is on sale by all local Agents of the Department. Price 3*d*. Post free 4½*d*.

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[46.]

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REPORTS

ON THE

Botanic Station, Agricultural School, and Land Settlement Scheme at St. Vincent, for the year 1902-3.

ALSO

REPORT

ON THE

Experiment Station, at Tortola, Virgin Islands, for the year 1902-3.

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AGRICULTURAL
NEWS.

A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. II. No. 35. BARBADOS, AUGUST 15, 1903. PRICE 1*d*.

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Agricultural Education in Jamaica.

IN Jamaica, where there are some 800 Elementary school teachers, considerable efforts have been made in connexion with their training, as a preliminary to the introduction of agricultural teaching in the Elementary schools of the colony. Some idea of the work that has been carried on in this direction was given in two papers, read at the last Agricultural Conference (*West Indian Bulletin*, Vol. III, p. 99). One was by Mr. A. B. McFarlane, Principal of the Mico Training College, and the other by Mr. W. R. Buttenshaw, then Lecturer in Agriculture in Jamaica.

Since 1900, four courses of lectures for teachers have been held, each lasting for about four weeks. These courses included lectures on agricultural science, which were calculated to equip the teachers for the work of giving simple lessons to children on plant and animal life, but especially in their relation to agriculture. Considerable time was, also, given to practical work at the Hope Gardens, where the teachers were instructed in general garden operations including the handling of tools, the making of seed beds, potting plants, budding, grafting, etc. The main idea was to place them in the position of being able to lay out and cultivate successfully small school gardens. Further they had the advantage of listening to lectures of a popular character by prominent agriculturists and others. Nearly 200 of the Jamaica teachers in charge of schools have now attended such courses of instruction.

In the curriculum of the training colleges, agriculture occupies a prominent place. For the two, or three, years that the students are in residence, they have regular courses of instruction in this subject. Not only do they attend lectures on the sciences bearing upon agriculture, but considerable time is also given to practical work. At the Mico Training College there is a large garden, where vine culture is a prominent feature, and where fruits and vegetables are also grown. In the second year, the students receive instruction at the Hope Gardens. In this way, provision is made for the younger generation of teachers, and each year some thirty or forty take their place in the ranks, fully equipped for carrying on this important branch of their work. It is encouraging to observe the earnest manner in which these younger men throw themselves into the work of advancing the improvement of agriculture among the small settlers. The interest of the teachers in agriculture is noticeable in connexion with the work of the local branches of the Agricultural Society; and they also take a prominent part in the work of district agricultural shows.

The Education Code of 1900 makes 'Science, general and agricultural' a primary subject in the examination for a teacher's certificate and also one of the four principal subjects in the elementary school curriculum. It is insisted that the instruction given shall not be confined to book work. The lessons must be illustrated by diagrams, simple experiments, and by plants grown in pots and boxes. In some schools the teachers have been most successful in bringing out the uses of manures, the advantages of draining and similar points, by means of box and pot experiments.

A special grant, not exceeding £10, is made for teaching practical agriculture. To obtain this grant a teacher has to satisfy the Inspector that 'satisfactory teaching in Agriculture or Horticulture has been given on a plot of land, approved for this purpose, out of school hours, for at least four hours a week on an average during the whole of the school year.' The plot must be at least a quarter of an acre in extent and surrounded by a good fence. There are a number of really well-kept school gardens in Jamaica, which, in addition to affording instruction to the boys and girls of the school, serve at the same time as a valuable object-lesson to the settlers of the district.

Since October 1902, opportunities have been given at the Government Laboratory for young men, who are intending to become planters or pen-keepers, to obtain a sound education in agricultural science. The course of study drawn up by Mr. H. H. Cousins, M.A., F.C.S., the Government Analytical and Agricultural Chemist, is designed to give to the students a thorough training in the sciences relating to tropical agriculture—a technical education, that will enable them to step into line with agriculturists in other parts of the world, by making use of the discoveries of scientists on the estate, the pen or in the sugar house. The course lasts for two years and at its close, a diploma may be granted by the Board of Agriculture. Three scholarships, of the annual value of £36, have been instituted in connexion with this course. They are to be awarded upon the results of a special examination, in which science is a prominent feature.

Nor has the education of the present generation of small settlers been lost sight of. There are in Jamaica two Travelling Instructors, giving the whole of their time to lectures and demonstrations, as well as three local instructors under the Agricultural Society.

It will thus be seen that Jamaica is making a serious effort to grapple with the problem of Agricultural Education, and the Board of Agriculture and the officers of the Education Department are to be congratulated upon the line of action that has been taken during the last few years.

SUGAR INDUSTRY.

Marasmius.

We have previously, in the *Agricultural News* (Vol. I, p. 258; Vol II, p. 162), drawn attention to Marasmius, the fungus causing a root disease of the sugar-cane, and to the fact that it is very prevalent this year in Barbados.

The symptoms of the disease are those of an insufficient water supply. The tips and edges of the leaves dry prematurely, and finally the leaves wither and drop off. If the leaf-sheaths at the base of the stem be examined, the white, felt-like 'mycelium' will be seen in them, and when the young roots are laid bare they will be seen to be dried up at the tips, and also covered with the fungus mycelium.

Marasmius spreads from cane to cane in two ways. The white mycelium grows through the soil and so continually infects fresh roots. At times, the fungus produces its reproductive organs. These are small, white toad-stools, which are produced at the base of the stool or on the roots of the diseased cane. These toad-stools bear immense numbers of spores ('seeds'), every one of which is capable of infecting a healthy cane.

These toad-stools are now to be found frequently in the cane fields. If one carefully examines the bases of cane stools which appear to be suffering from root disease, particularly after a shower of rain, a small group of these bodies will often be found. In this case there can be no difficulty in diagnosing the disease.

The proper measures to adopt will depend upon circumstances. If the cane is badly attacked, and obviously will produce but little growth, it will be best to dig it up at once and burn it. If, however, the attack is less severe, it may be as well to allow the cane to continue growing till the crop season. Care should be taken to isolate, as far as possible, the diseased area by means of a trench. When the crop has been taken off, the diseased stools should be removed and burnt, and the field planted in some alternative crop.

Sugar Trade with Canada.

The following extract from the report of Mr. S. L. Horsford, the Canadian commercial agent for St. Kitts-Nevis and the Virgin Islands, which appeared in the Jamaica *Gleaner* of July 23, will give some idea of the way in which West Indian sugar is being diverted from New York to Canada:—

> While hitherto the bulk of our sugar has been shipped on consignment to New York, and only comparatively small parcels have been forwarded to Canada for sale, during the last and present seasons the conditions have been entirely changed. Last year nearly 54 per cent. of our sugar was shipped to Halifax, against 36 per cent. to New York and only 7 per cent. to the United Kingdom. While this year, the Canadian proportion promises to be very considerably increased, and the capacity of the subsidized steamers is being taxed to the utmost, to find space for the ever increasing demand. This is extremely satisfactory, and should the existing conditions continue, there is every hope that the trade thus established will prove to be a permanent one.

A Demerara Seedling Cane in Louisiana.

In the *15th. Annual Report of the Louisiana Agricultural Experiment Station,* Dr. Stubbs has given the following interesting data concerning the Demerara seedling cane, D. 74, which we take from the *Louisiana Planter* for July 4, 1903:—

> In an experiment on about twelve short tons of D. 74 and other canes, designated as 'home canes,' but not as to whether they were purple or striped, the station apparatus extracted 76·86 per cent. of juice from the seedling and but 75·61 per cent. from the Louisiana cane. The juice from the seedling cane had a sucrose content of 12·14 per cent. and a purity of 78·02 per cent., as against a sucrose content of 10·69 per cent. and a purity of 74·28 per cent. for the Louisiana cane. From the seedlings there were produced 144 ℔. of first sugar per ton of cane, and from the Louisiana canes 115 ℔. These data indicate clearly the excellence of this noted seedling D. No. 74, and we trust the industrial ventures, that are now being made with it in this state will fully substantiate the merit indicated by the station work.

COTTON.

British Guiana.

The London *Times* has the following reference to the position of the cotton industry in British Guiana:—

> The question of re-embarking in the cultivation of cotton is receiving serious consideration here. The country is admirably adapted for cotton growing; indeed, formerly, there were 400 cotton estates, which exported 10,000,000 ℔. of cotton annually. The present agitation among manufacturers at home for colonial-grown cotton has once more directed attention to the possibilities of British Guiana. A Cotton Growers' Association has been started in Berbice to encourage the peasantry to take up the industry, and Sir Daniel Morris, K.C.M.G., the Commissioner of the Imperial Department of Agriculture for the West Indies, is giving the enterprise the weight of his support. In an address to planters and others, the Commissioner declared that there was no doubt whatever that cotton, when carried on under favourable circumstances, was a perfectly staple industry. The prosperity of the industry in Texas would justify those interested in this colony carrying on experiments, to judge whether cotton cultivation under present circumstances was suitable. If it did prove suitable, then the industry would gradually grow, as the people became satisfied with the prospects of it, and cotton might become a subsidiary industry to sugar.
>
> It may be mentioned that the Board of Agriculture has imported a quantity of Egyptian seed for cultivation, and several planters have laid out land in experimental plots.

As a result of the recommendation made by Sir Daniel Morris during his recent visit to British Guiana, experiments in cotton growing are being undertaken on several of the principal estates, with the view of carefully testing the results. At Albion, Windsor Forest and Friends, about 10 acres are proposed to be placed under cotton by the Colonial Company.

Porto Rico and Cuba.

In connexion with the efforts that are being made to introduce cotton growing into the British West Indies, the following extract from the *Sugar Planters' Journal* is interesting:—

> Porto Rico has also come into line for cotton growing honours, as evidenced by late advices from that island, which state that the cotton craze bids fair to displace considerable sugar-cane areas. Cuba, too, anticipates big profits from cotton, but as the boll weevil is there, it is not probable that the sugar areas will be much decreased by cotton culture.

FUMIGATION OF IMPORTED PLANTS.

All plants imported into Jamaica are fumigated to prevent the introduction of harmful insects. The following is an extract from the report of the Government Analytical and Agricultural Chemist for the year ending March 31, 1903:—

> To promote the convenience of the public and of the service, the fumigation of plants is now carried on at the point of delivery by the custom and postal officers under my direction. Four sets of special fumigating apparatus have been provided, and the officers instructed in the process. The dose required for any particular consignment of plants is prescribed by the chemist over the telephone.
>
> A good deal of misapprehension exists among the public as to the effects of fumigation on imported plants. If these arrive in fair condition, the treatment with hydrocyanic acid has been found harmless and even beneficial. Care is taken to adjust the dose and the exposure to the resistant powers of the plant under treatment.

WEST INDIAN FRUIT.

BANANAS AND POTASH.

The *Journal of the Jamaica Agricultural Society* for July, publishes letters by Dr. Neish and Mr. H. H. Cousins, the Government Analytical and Agricultural Chemist, relating to the removal of potash from the soil in the exportations of bananas. Dr. Neish draws attention to the enormous amount of mineral matter, especially potash, that is annually abstracted from the banana lands, and regards this as indicating the necessity for the application of potassic manures. Mr. Cousins estimates that 1,414 tons of potash are annually exported, but adds:—

> This amount is of small account when compared with the stores in the soil. Allowing for 300 bunches per acre and considering the top 18 inches of soil only, I find as follows:—
>
> *Irrigation lands, St. Catherine.* Available potash to last 44 years, total potash to produce full crops for 333 years.
>
> *Average banana lands, St. Mary.* Potash supply equal to 600 crops of bananas.
>
> The experiments conducted during 1902 indicated that, apart from humus, fertilizers were not needed and were not profitable on the majority of soils.

The editor of the *Journal of the Jamaica Agriculture Society* reviews the correspondence between Dr. Neish and Mr. Cousins and urges planters to avoid further impoverishment of the soil by the removal from the land of banana trash, and to give greater attention to the addition of pen manure and other humus-forming substances.

THE TREE TOMATO.

The Tree Tomato is known botanically as *Cyphomandra betacea.* According to the *Bulletin of the Botanical Department, Jamaica,* No. 40:—

> It is a native of the Andes and is met with occasionally in the hills of Jamaica, apparently wild. The plant is an erect shrub. The seedlings will bear fruit in from one to two years—cuttings in less than a year.

A lady gardener writing in the *Rural Californian* for March last upon the value of the Tree Tomato says:—

> The foliage is large and handsome, the branches spreading. The fruit is pendant in clusters below the foliage, is the size of a large egg and of a beautiful orange-salmon colour when ripe. It has a decided sub-acid taste, slightly resembling the tomato. It is delicious raw, served with sugar and cream, or cooked as sauce, and for jelly or jam is very fine. It will keep for weeks, as it does not bruise on account of its very tough skin and the solid nature of the fruit covering the seeds, which are like those of the tomato. It is a showy plant for house and conservatory, and a most beautiful plant in the garden. It is known as the 'poor man's fruit.'

PINE-APPLES AT MONTSERRAT.

An experiment in the growing of pine-apples at the Experiment Station at Montserrat has given the following interesting results:—

> $\frac{1}{12}$ of an acre was planted with the Black Antigua variety. One half the plot was manured with a mixture of kainit and basic slag, at the rate of 3 cwt. of each to the acre. The other half was unmanured. The fruits when cut were weighed, with the result that the manured section gave 3,550 lb. and the unmanured 2,972 lb.

ROSES IN JAMAICA.

In the July number of the *Journal of the Jamaica Agricultural Society,* Mr. H. H. Cousins continues his notes on 'Roses in Jamaica.' In the present article the best varieties for Jamaica are dealt with, and from this we take the following extracts:—

> The Tea Rose is *par-excellence* the rose for a tropical climate and some of the hybrid Teas will be found equally successful. The climate encourages vigorous growth and a rapid opening of the flowers. The chief defect in the floral excellence of individual blooms arises from a curling back of the outer petals, destroying the regularity of the circular outline of the flowers. Full-petalled roses are a *sine qua non.*
>
> The best six roses for supplying a continuous supply of cut flowers are:—
>
> *White Cochet:* the best rose of this colour in cultivation.
> *Pink Cochet:* without exception the best pink rose for Jamaica.
> *Kaiserin Augusta Victoria:* this should be grown everywhere, as it comes in splendid form.
> *Balduin* (or *Helen Gould*)*:* does splendidly in Jamaica, yielding a large number of flowers of good shape.
> *Yellow Cochet:* especially suitable for open beds.
> *La France:* the scent alone places this old rose upon our list of selections.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

We print further notes by Mr. J. R. Jackson, A.L.S., on the London Spice and Drug Market. The last article of this series appeared in the *Agricultural News*, Vol. II, p. 213 :—

Throughout the month of June business in drugs, chemicals and spices, has been at a very low ebb indeed. The summing up of trade in the middle of the month was, that it was in a 'deplorable condition'—a position that had scarcely changed at the time of writing at the beginning of July.

GINGER.

Jamaica ginger, to which we have before alluded as showing an upward tendency, still continues to maintain its position. At the auction on the 10th. of the month, 1,112 packages were offered, of which about 750 sold at previously quoted prices, namely,—very bold at 65*s.* ; good 51*s.* to 55*s.* ; medium to fair washed, 45*s.* 6*d.* to 49*s.* ; ordinary to medium dullish, 42*s.* 6*d.* to 44*s.* 6*d.* ; and small dull 43*s.* Cochin was also in good supply, nearly 1,900 packages being offered and some 612 sold; bold, some good medium cut and scraped, realizing 72*s.* to 72*s.* 6*d.* ; white medium fetched 55*s.* ; fair to good small, 43*s.* 6*d.* to 46*s.*, and washed rough, 33*s.* These prices remained practically the same during the month, and at the sale on June 24, the following were the quotations :— Jamaica—of which 757 barrels were offered and about half sold—good bold bright plump, 62*s.* to 65*s.* ; fair bright 53*s.* 6*d.* to 59*s.* 6*d.* ; middling 46*s.* to 52*s.* ; and ordinary 41*s.* 6*d.* to 43*s.* 6*d.* At this sale 466 packages were offered, and only 62 sold at rates varying from 41*s.* 6*d.* to 42*s.* for ordinary small cut, while washed rough was bought in at 36*s.* to 37*s.*

MACE, PIMENTO, KOLA, BAY OIL.

Mace, at the sale on June 10, was represented by 43 packages West Indian, all of which were sold,—pale and reddish at 2*s.* to 2*s.* 1*d.*, good red 1*s.* 10*d.* to 2*s.*, and broken 1*s.* 9*d.* These prices varied but little throughout the month and at the close stood as follows :—Fair to good pale, 2*s.* to 2*s.* 4*d.* ; fair pale and reddish, 1*s.* 10*d.* to 1*s.* 11*d.* At this sale Pimento was sold to the extent of 113 bags at 2⅜*d.* At the drug sale on the 11th. for two bags good bright washed Kola nuts 7½*d.* per ℔. was realized, while ground kola sold at 2¾*d.* West Indian distilled Oil of Bay sold at 5*s.* 10*d.*, while at the close of this month a case of distilled oil from Tobago, said to be scented with paraffin oil, sold at 5*s.* 8*d.* per ℔.

SARSAPARILLA.

Sarsaparilla,—six bales Grey Jamaica, sold at 1*s.* 1*d.* per ℔., while Lima Jamaica was disposed of at steady prices realizing 11*d.* to 1*s.* for sound, 10*d.* for sea damaged, 9*d.* for coarse and damaged and good bright ; red native, slightly country damaged, sold at from 11*d.* to 1*s.* 1*d.* per ℔. At the end of the month the prices stood thus:—Grey Jamaica sold at steady rates realizing 1*s.* 3*d.* for good fibrous, 1*s.* 2*d.* for fair, and 1*s.* 1*d.* for sea damaged. In one instance Lima Jamaica was held for 1*s.*, and 13 packages from another consignment sold at 11*d.* to 1*s.* per ℔. for damaged, while native sold at prices varying from 8*d.* to 1*s.* 2*d.* In the middle of the month Honduras was quoted at 1*s.* 4*d.* to 1*s.* 5*d.* per ℔.

TAMARINDS.

At the spice sale on June 10, 39 barrels of Barbados tamarinds sold at 11*s.*, and 265 barrels Antigua were bought in at 9*s.* to 10*s.*, and at the drug auctions on the following day 12 barrels palish Antigua realized 9*s.* per cwt. These prices had somewhat declined at the end of the month, when they stood thus—for common and very stoney West Indian, 77 packages were held at from 8*s.* to 9*s.* per cwt. in bond.

OIL OF LIME, CASSIA FISTULA, ANNATTO.

At the same sale, West Indian distilled oil of lime, of good quality, was held at 1*s.* 9*d.* per ℔., 1*s.* 8*d.* being refused. *Cassia Fistula*, described as 'dullish and part rattley Dominica pod, was partly sold at 27*s.* 6*d.* per cwt. No quotations have been given for West Indian annatto seed, but in the middle of the month dull East Indian sold at 2¾*d.* per ℔., while at the end, fair quality Madras fetched 3*d.*

The general depression, that prevailed throughout the month both on the drug and spice markets, will be realized from the meagre character of the foregoing notes.

THE CASE AGAINST THE MUNGOOSE.

The following is a summary of the information laid against the mungoose by the Agricultural Association of Barbados. This is contained in a petition presented to the Governor, praying that action be taken by the Legislature to lessen the numbers, or get rid altogether, of the mungoose in this island.

The main points of the petition are as follows:—

That since the introduction of the mungoose, insectivorous birds, snakes, toads, bats and lizards, which were fairly numerous, have gradually diminished, until now, few insectivorous creatures are seen, and snakes, toads and lizards are rarely found in the canefields.

That owing to the destruction of these birds, reptiles, etc., which prey on the insects attacking the sugar-cane and other crops, these pests have so increased that heavy loss is now sustained by the sugar-cane growers and other inhabitants of this island, who are engaged in agriculture. That the mungoose is almost, if not entirely, responsible for the great diminution of the insectivorous birds, lizards, etc., your petitioners submit, is abundantly proved by the researches of the Rev. N. B. Watson, the Vicar of St. Martin, an entomologist of repute, and the information, supplied them by Mr. Henry A. Ballou, B.Sc., the Entomologist of the Imperial Department of Agriculture. Mr. Watson, in the information supplied your petitioners, stated that from 1900 to the present time, he had examined the contents of the stomachs of fifty-nine mungoose and some lizards. In the stomachs of fifteen of the mungoose, he found the remains of toads, and in the stomachs of the toads taken from the mungoose, he found portions of beetles of various descriptions; in seven mungoose stomachs, he found portions of green lizards; in one, portions of ground lizard; in seven, the remains of blackbirds; in six, centipedes; in four, portions of the ground dove; in one, the remains of a small yellow bird. In the stomachs of two green lizards examined he found larvæ and pupæ of moths, the magot of a fly, three caterpillars, a small field cricket, a field spider, and portions of some beetle. Mr. Ballou informed your petitioners that in Dominica, where there is no mungoose, ground lizards are numerous.

That in Barbados, prior to the introduction of the mungoose, the green and ground lizards were to be found in large numbers in the sugar-cane fields eating the moth-borers, as they emerged from the tunnels in the canes to dry their wings, prior to taking flight.

That the moth-borer tunnels provide easy access for the spores of the rind fungus, a disease which has caused great loss in the past to your petitioners and others engaged in the culture of the sugar-cane; and your petitioners regret to state it is still causing considerable loss.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 255 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d., post free 3s. 3d.

Agricultural News

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NOTES AND COMMENTS.

Peruvian Maize.

Seeds of a very fine variety of maize, known as Peruvian or Cuzco maize, have recently been distributed by the Imperial Department of Agriculture to all the Botanic Stations in the West Indies. In its native habitat, the Andes, at an elevation of 7,000 to 8,000 feet, this corn grows to a great height—20 feet or more. It will be interesting to observe how it adapts itself to its new surroundings. In South Africa and Australia, so far, poor results have been obtained.

The Prison Farm at Jamaica.

Owing mainly to the efforts of the Hon'ble Sidney Olivier, C.M.G., the Chairman of the Board of Agriculture, a farm was recently established at the Spanish Town Prison, for the purpose of supplying that and, if possible, other public institutions with food-stuffs, and at the same time giving the prisoners some instruction in agricultural methods. The balance sheet, for the year ended March 31, 1903, showed a small balance profit after paying all working expenses and interest on the capital spent. In the report, Mr. Olivier writes:—'The results up to date appear to the Inspector General and to myself to be extremely satisfactory and to promise a success to this undertaking, fully equal to the expectations in reliance upon which we urged its inception.'

The Trinidad Bulletin.

In the July number of the *Trinidad Bulletin of Miscellaneous Information*, there is reproduced from a pamphlet issued by the United States Department of Agriculture, information relating to the Mole cricket in Porto Rico, from which extracts were given on page 104 of this volume. There are also interesting notes upon various agricultural subjects, including an account of experiments in treating rubber fluids with formalin, which was found to yield very satisfactory results.

The Orange Trade.

A recent number of the *Fruit Trade Journal* publishes an interview with an orange shipper from Porto Rico, which would seem to indicate that Porto Rico is likely to become a serious rival to Jamaica in the orange trade. It is stated that in two or three years time there will be some 400 acres of cultivated groves in bearing. It is also estimated that by the end of six years we may expect over one million boxes of cultivated fruit to be shipped from that island, since there should be, by that time, about 10,000 acres of orange trees in bearing.

Jamaica Exports.

According to tables published in the *Board of Trade Journal*, the export trade of Jamaica for the year 1902, showed an increase of nearly 25 per cent. over that of the preceding year. The improvement was mainly due to the development of the Banana industry, which increased fully 50 per cent., and to a big increase in the value of logwood exported, viz., £164,117 as against £92,622 in 1901. Oranges, cacao and pimento also show a very decided improvement, whereas the value of coffee has largely decreased. There was also a considerable decrease in the value of rum and ginger exported.

Duty on Onion Crates in the United States.

In view of the probable shipment of onions from the West Indies to New York early next year, the question has been raised, whether duty would be charged on the crates holding the onions, if obtained from other countries.

By the courtesy of General Macallister, the United States Consul at Barbados, a letter has been received from the Treasury Department as follows:—

> Washington, D.C., July 16, 1903.
>
> I have the honour to acknowledge the receipt of your letter of the 14th. instant, enclosing a copy of a despatch from the Consul of the United States at Barbados asking the rate of duty on crates used for the transportation of onions from that island to the United States, and in reply to state, that, if such crates are found to be coverings not designed for use otherwise than in the *bona fide* transportation of such merchandise to this country, they would be free of duty. If designed for use otherwise than in the *bona fide* transportation of such merchandise to the United States, duty would be assessed thereon, according to the material used in their manufacture, at the rate to which the same would be subject if separately imported.

Preparing Para Rubber in Ceylon.

We publish in the present issue an instructive article upon the subject of preparing Para rubber in Ceylon. The writer who has had considerable experience as a rubber planter, being in charge of a plantation yielding 2 tons of rubber per annum, gives full and detailed directions as to the methods of collecting and coagulating the rubber. Illustrations are given which will greatly assist readers to follow the description of the process. The superiority of the method described must be admitted when the high price obtained for the product on Mr. Holloway's estate is learned.

◆

The Cacao Canker in Ceylon.

Mention was made in the *Agricultural News* (Vol. I, p. 29), of the ravages of the fungus causing the canker disease in Ceylon. In the notes by Mr. J. B. Carruthers, F.L.S., the Acting Director of the Royal Botanic Gardens, on economic products in Ceylon, published in the *Administration Reports* for 1902, reference is again made to this disease. The writer points out that, in consequence of the abnormal rainfall in the cacao districts, the spread of the canker fungus has been favoured. Success seems to have attended the remedial and preventive work on those few estates where serious effort has been made. It is pointed out, however, that in most cases the largeness of the crop, together with the increased cost of curing owing to unfavourable weather, has prevented the crusade against the disease being carried on. Hope is expressed in the report that serious and united action will be taken to rid the estates of this pest.

◆

Refuse Manures in Jamaica.

In the *Bulletin of the Department of Agriculture, Jamaica*, for June and July 1903, there are given results of analyses, by Mr. H. H. Cousins, of certain refuse materials capable of increasing the fertility of the soil. The substances analysed were:—

Pond mud: This material, which was cleared out of a pond on a sugar estate, was rich in phosphates, fairly rich in nitrogen and deficient in potash.

Banana Trash Ash: The value of this substance as a manure is estimated at £2 per ton, and it is recommended for use on many soils deficient in potash. The ash can be obtained in large quantities from the Railway, where accumulations of banana trash brought down from the plantations with the fruit are burned.

Sheep Manure: The analysis of a sample showed its value to be about £2 per ton.

City refuse from deposit Ground: Estimated value 12*s.* per ton, free on train at Kingston.

Bat Manure: Considerable accumulations are found in caves and other sheltered places. Analyses show that it is a fairly well balanced manure. The better samples are principally nitrogenous in character. The 'average' value of all the samples analysed would be about £3 1*s.* 6*d.* per ton.

Ground Nuts in the West Indies.

The second part of Volume IV of the *West Indian Bulletin*, which has just been issued, contains an important paper on 'ground nuts' by Mr. W. G. Freeman, A.R.C.S., B.Sc., F.L.S., late Scientific Assistant to the Imperial Department of Agriculture. Information is given as to the present condition of the ground nut industry in the West Indies, which goes to show that 'in almost all of the West Indian Islands, the ground nut is known and cultivated to some extent, but in no case is it an important crop.' In regard to the uses of the ground nut, Mr. Freeman points out that in addition to the local use, where the ripe seeds are parched and eaten, the plant is utilized in a variety of ways. In the United States, where 40,000 tons are raised annually, enormous quantities are used in confectionery. The oil, obtained by crushing the seeds, is employed for culinary purposes, as a substitute for olive oil, for lubricating, and as an illuminant.

The refuse left after the expression of the oil forms an oil cake, which is one of the most concentrated food-stuffs obtainable. The cake contains upwards of 50 per cent. of protein. A fodder of excellent quality can also be made by drying the ground nut vines.

In concluding his paper, Mr. Freeman makes suggestions for the future, advocating the growth of the plant, both as a source of food and as a source of oil and oil-meal, and in support of these recommendations gives particulars of trial consignments, forwarded by the Imperial Department of Agriculture, to ascertain the value of West Indian ground nuts in the British market. In one case the ground nuts were valued at about £16 to £17 per ton.

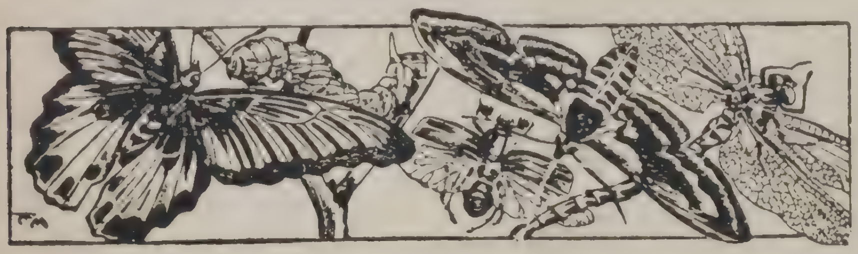
◆

British Guiana Report.

The report on the Agricultural work in the Botanic Gardens and the Government Laboratory, British Guiana, for the years 1896-1902, Parts II and III, is a valuable record of some of the work done in that colony in recent years. Professor Harrison states: 'These parts deal principally with analyses, made by Mr. Williams, assistant analyst in this Department and myself, of articles of possible economic importance submitted from time to time by Mr. Jenman, and with the analyses of a large number of samples of soils of the interior of the colony. This brings to a conclusion my account of the more recent agricultural work carried on by the late Mr. Jenman and myself.'

Part II contains a large number of analyses, amongst them being those of cassava, showing the proportions of hydrocyanic acid in sweet and bitter varieties, of *Cyperus rotundus* or nut grass, and of *Phaseolus semierectus*, a common leguminous plant used for fodder. Analyses are also given of the seeds and pods of the Saman tree *(Pithecolobium saman)*, to show the proportions of food nutrients found in the seed and in the 'flesh' of the pod. Results are also given of the analyses of native hay and of the manure derived therefrom.

In Part III is to be found the composition of typical soils from the North Western, Essequebo, Demerara River, Berbice River and Surinam districts.



INSECT NOTES.

St. Lucia.

The following notes on the economic entomology of St. Lucia are taken from Mr. H. A. Ballou's report on his visit to that island in May last:—

I examined the plants at the Botanic Station, both in the gardens and in the nurseries, but did not find scales present in large numbers or doing much harm.

The spraying outfit at the Botanic Station consists of a 'Fruitall' outfit, two Knapsack sprayers (one of them at Riviére Dorèe), an 'Atomizer' syringe, together with whale oil soap, rosin, soda and kerosene.

Good results are reported from the treatment of scale insects with rosin compound. The Black Line scale here, as at other Stations, is difficult to keep down, and a *Dactylopius* on asparagus does not yield to treatment with rosin compound. Kerosene emulsion is recommended for this latter.

At Union the spraying equipment and the list of insecticides are the same as those at the Botanic Station. The nurseries are comparatively free from insects, but the bananas, plantains, yams, tannias, and plants in the young cacao plantations are attacked by a large black beetle which, in the adult form, burrows into the fleshy base of these plants and, in the banana and plantain, sometimes works into the stem. The grub of this beetle could not be found, nor could any information be obtained as to its life history, although several of the beetles themselves were found.

At one estate that I visited, the cacao trees have been seriously injured, and in some cases killed, by a grub which attacks the roots. This insect eats the soft cortex of the root, sometimes completely stripping it for several inches. It sometimes channels the harder woody part of the root, but, so far as seen, does not bore into the wood. This insect is probably the Root-borer of the sugar-cane described by the Rev. N. B. Watson (*West Indian Bulletin:* Vol. IV, p. 37). I was informed that the cacao plantations were formerly planted in sugar-cane. This would probably account for the presence of this insect in cacao and suggests a possible remedy. Stools of cane might be planted in the cacao fields and, as the canes were seen to be affected by the grubs, they might be treated with carbon bisulphide. By always having growing canes in a cacao field and continually treating the grubs attacking them, it would seem that the numbers might be materially reduced. Of course, this would depend on whether the beetle preferred cane to cacao. If cane be preferred, the treatment may prove valuable.

I was unable to see any of the work of the Screw worm *(Lucilia macellaria)* during my short stay, but I was informed that, while it is still to be found in various parts of the island, it is not so severe a pest as formerly, and that, by careful attention to wounds and the use of remedies suggested by the Imperial Department of Agriculture, the injury can be greatly reduced.

The limes at the Riviére Dorèe experiment plots were found to be infested with scales, the most common being the Purple Scale *(Mytilaspis citricola)* and the Orange Snow Scale *(Chionaspis citri)*.

The cotton, at this place, was rather old and ready to be cut. Many of the plants were infested by the Smaller Snow Scale *(Chionaspis minor)*. Many old bolls were found infested by a minute moth larva, which was boring into the seed. Probably these bolls were useless before being attacked, as the fibre of the cotton was closely matted, but they were serving as a breeding place for an insect that may, if it become numerous enough, attack good, healthy bolls. I recommend cutting the cotton and burning all the tops, also spraying the limes and stumps of the cotton to kill the scale insects.

It has been a popular tradition for many years that the Hercules beetle was responsible for the cutting off of the branches of several trees, especially the Pois Doux. Entomologists have known that this could not be the case, and I have now received specimens of a beetle that rings the stems of the Pois Doux and Saronetta trees, together with a sample of their work.

The land crabs and mole crickets have been troublesome at the Botanic Station. The former have been controlled by means of phosphorus in a bait of corn-meal mash. I suggested the trial of Paris green in the place of the phosphorus as the cost would be less. The mole cricket has been dug out of the vegetable beds and killed. This has been found more effective than any system of trapping yet tried here. I suggested the trial of a bait of fresh grass or tender leaves chopped up fine and poisoned with Paris green, this should be placed about the infested area either on the surface of the ground or in the runways of the insect.

PONY BREEDING.

Efforts are being made in Jamaica to encourage the breeding of horses with a view to a possible export trade. It has been suggested that Jamaica might do a considerable trade in Polo ponies, and also in horses for military purposes. The following extracts from an article on the subject of 'pony breeding,' which appeared in the *Farmer and Stock Breeder* of July 20, may be of interest to those who are giving the matter consideration:—

The spread of polo as a healthy and fashionable sport has turned the attention of breeders in this country to the systematized breeding of polo ponies. So far as we can see, the breeding of polo ponies is confined chiefly to a few fanciers, the general run of farmers not having given any serious attention to it. The farmer's attitude towards polo pony breeding is explained by the difficulty of breeding to within 2 inches of a recognized height. Moreover, there is always the difficulty of securing a suitable sire. Mares there are in abundance, but small thoroughbreds, Arabs and Barbs are difficult to procure and involve, as a rule, a railway journey for service.

More popular, of course, is the rearing and production of saddle and harness ponies. An animal that is good in saddle is never perfection in harness.

It is to the harness pony that attention has been very largely attracted of late years. But here again the breeders ask, 'What type must I aim at?' The Hackney type is essentially a harness type, but in pony breeding, this question of type has engaged the earnest attention of breeders without any profitable solution being found. As a matter of fact, that which sells a pony is not altogether his type; it is chiefly his action. Yet another class of pony is that which is suitable for mounted infantry.

PREPARING PARA RUBBER IN CEYLON.

The following interesting information on the subject of preparing Para rubber in Ceylon was recently contributed to the *India Rubber World* (March 11, 1903), by Mr. Francis J. Holloway, of Kepitigalla estate in that island:—

I have much pleasure in complying with your request for full particulars as to the method of collecting and coagulating rubber, up to the time of despatch for market, employed on the Kepitigalla estate [at Matale, Ceylon]. After considerable experience, with several methods employed in other parts of the globe, I think there is none other equal to the one adopted in Ceylon, and if this were used in other countries it certainly would mean a rise in price of at least 6*d.* per pound for rubber.

The tool employed for tapping rubber trees on this estate is not equalled by any other in use, for its clean cut and absolutely safe incision, the tree not being damaged in the least. The shape is indicated by the accompanying cut.

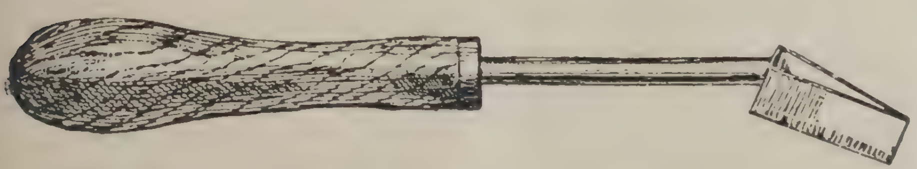


Fig. 19. Tool for incising Rubber Tree. *b.*

In practice both hands are used to hold the wooden handle. Placing the corner of the angle *b.* at the start of the cut, the tool is pulled downward two or three times in the same incision, care being taken not to cut into the wood. Though this may seem difficult at the beginning, a little practice will soon make the work easy. After two cuts have been made, converging in the shape of the letter V, another labourer places a small tin cup at the lower point of the V (fig. 20). Care should be taken that at this point the two cuts do not run together, but that a small space be left between them. The incisions should be about 4 inches long, with a space of at least 3 inches between them at the top. The same space (3 inches) should be left before beginning the next pair of incisions in going around the tree. This is absolutely necessary, for if the cuts join, the flow of sap to the tree will cease, and the tree will die. The first series of incisions should be made as far up the tree as a person standing on the ground can reach. Every second day a new band of incisions may be made lower down, as indicated in the drawing (fig. 21). About twenty rings or bands of incisions can be made around a tree within a distance of 6 feet from the ground. About five V shaped incisions may be made around a tree 40 inches in circumference.

The tin cups used are about 2 inches in diameter and 2 in depth. As the *latex* flows immediately after the cuts are made, the tapper's assistant at once presses the edge of a tin cup into the bark, no nails or putty or wax being required to hold it in place. A third labourer follows with a pail of water, putting a small quantity into each tin to prevent the *latex* from coagulating—a very necessary precaution, especially on a hot day. The tapping as above described is done early in the morning, and in this way three men can place 400 cups in a half day, and attend to the rubber obtained.

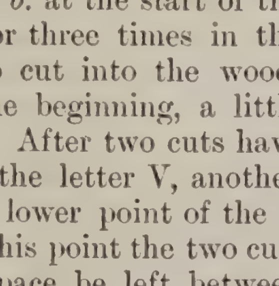


Fig. 20.

Incisions with tin attached.

The contents of all the tins are stirred once, or oftener, besides which the labourers must see to it that none of them overflow. Work is started about 6 a.m. and by 11 a.m. all the tins have been taken off and emptied into a pail. While one coolie carries the pail of *latex* to the factory, the others wash out the tins and at once replace them under the same cuts. The tins are again emptied, in the same manner, at 3 p.m., which completes the yield of *latex* from a given set of incisions. In the meantime, after the tins are washed, the coolies pick off any rubber that may have dried in the wounds made on the last round, which is called scrap.

As the *latex* is brought to the factory in a liquid state (mixed with water, which is necessary to enable the *latex* to go through the process by which the rubber is preserved), it is strained through a very fine wire mesh—a milk strainer, for example—into shallow tin pans, 7 inches square by 2 inches in depth, in which it is left to stand overnight. By morning the rubber will have coagulated naturally, without the use of any chemicals, and most of the water will have become separated from the pure rubber. The lump of rubber is then taken out and placed on a table and gently pressed with the hand to exclude the water, after which a wooden roller worked by hand is passed over it, back and forth, until more of the water has been expressed, leaving a flat sheet of rubber about 8 inches square and $\frac{3}{8}$ inch thick. The lumps of rubber thus made are placed on caned trays or frames about 6x3 feet, caned like the bottom of a chair, though not so closely woven. After the rubber sheets have remained on the trays for four or five days, they are hung to dry on wires stretched across the room, after which they will require frequent attention to prevent mildew, a man being detailed to rub off all mildew spots with a rag. About two months are required for the rubber to become thoroughly dry and free from white patches. So long as these patches appear, it is an indication of dampness and further drying will be required.

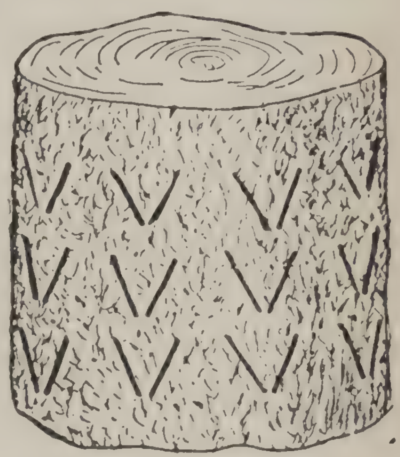


Fig. 21.

Relative Position of Series of Incisions.

When thoroughly dry, the sheets of rubber are ready for shipment, and are packed in boxes about 18 inches square and 8 inches deep—usually about 50 ℔. to a box. The secret of the high prices obtained for rubber from Ceylon lies (1) in the straining of the *latex* by which every particle of dirt is kept out, and (2) in the thinness of the sheets of rubber, which permits any one to see that they are free from dirt, sand, etc. No chemicals are used, and no heating is required. On the whole this is the simplest method, when one knows how, that could possibly be adopted. The rubber from most countries now comes to market in large pieces, and can conceal any amount of impurity, while in other cases the *latex* is allowed to dry on the stem of the tree and when pulled off contains a large percentage of bark and dirt, which means loss to the buyer and extra work in the factory.

The last sales of rubber from this estate have brought probably the highest average price of any rubber sold in the world during the same period, and this is saying a good deal, namely: an average of 3*s.* 11*d.* per pound. The total output for Ceylon for 1903 will be about 10 tons, of which this estate will send 2 tons.

REARING OF DUCKS.

Mr. Barclay, who has had considerable experience in duck-rearing in the West Indies, has already dealt with the breeding and feeding of ducks, and discussed the suitability of the different breeds to local conditions. In the present article, he takes up the question of housing:—

HOUSING.

Ducks rarely take cold, enjoy water so much, and are so fond of feeding by night, that there would be no housing problem at all, were it not for the fact, already explained, of their being so careless in their egg-laying. This is usually done very early in the morning, and consequently, they require to be penned at night. In the West Indies they must not be shut in a closed pen or house, for though very hardy where cold and wet are concerned, they are, on the other hand, far more sensitive than fowls to heat and lack of fresh air. The open house described for fowls will do for ducks, that is, closed on the windy side against the wind with sides made of wattle or mesh wire-netting, and an open or railed front with good spaces between the rails. As ducks do not perch (though Muscovies sometimes like to sit on a fence or roof-top), the house can be made lower than for fowls.

A small run should be enclosed around the house, so that they may forage a little during the night, and if their evening feed is ground corn, peas, paddy-rice or small grain like Guinea corn, and is scattered about the grass in the pen, they will be kept busy seeking their food. It is advisable to have in the pen the foraging heap already described. This corresponds with the scratching heap for hens, except that with fowls it may be dry and dusty, while it is better kept damp for ducks. The ducks will be able to do most of their feeding there during the night, and this seems more natural to them.

Nests should be made in the same way as for hens, but of course not placed off the ground. Boxes or barrels laid on their sides make good nests, with some dried grass or straw, (which is always better than banana or plantain trash) and a nest egg put in each. It should be particularly noted that, as with fowls, the nests should be made private. No bird likes to be in full view of even its own kind when it lays. Just before dark, the feeder should go into the pen with the ground grain in a dish, which should be shaken to let the ducks hear, and the same call should be made regularly. Generally in Jamaica the call for all fowls is 'Coop-coop-coop'! When the ducks are all in, the feed should be scattered around and a part flung on to the forage heap. The water dishes should be looked to, and kept full. The gate should then be locked and the ducks will be safe till morning. Probably greater safety will be secured, in many parts, if a good bull-terrier or other grim representative of the canine species, is placed at the gate over night with his kennel for shelter.

In the morning the nests should be looked at to see how many ducks have laid. By feeling at the ovary of any bird you are doubtful of, you will soon know whether any have still to lay, for if the egg is to come, it can be plainly felt. Such birds should be kept in for an hour or two longer, and let out after laying. The soft food should then be given; those left inside to lay getting a little more than those let out early to forage. Ducks cannot be successfully kept penned altogether, as they foul the ground very quickly. Whenever the ground in the pen gets foul, even slightly, the soil should be dug over. The house and nests should be regularly cleaned and kept fresh. Strong flyers, like Muscovies and Indian Runners, must have a wing cut, otherwise they will promptly fly out of the pen. Or the pen can be wired over the top.

RABBIT-KEEPING AT JAMAICA.

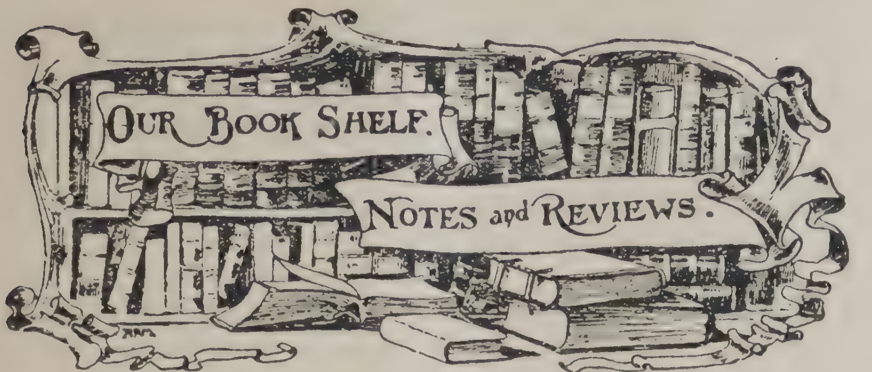
The *Journal of the Jamaica Agricultural Society* for July 1903, has an interesting and useful article on rabbit-keeping. The writer has evidently had considerable experience in keeping rabbits for profit in Jamaica, and the following extracts should be of considerable help to others in the West Indies:—

Hutches.—These may be of any convenient shape, as large as can be afforded, with high roof well overhanging to give shelter from driving rain. Three sides may be wired (one inch mesh wire) and one boarded. To ensure a clean, dry house, the floor should be of wire netting (half-inch mesh) covered with dried hay grass. This should be put in fresh every morning and the animals will feed heartily upon it. All the woodwork of the hutches should be painted inside and out, with tar thinned with a little kerosene oil. This should be renewed every few months. It acts as a preservative to the wood, keeps away insects and prevents the rabbits from gnawing.

Breeding.—Hutches for nurseries should be made more snug than those intended for half-grown or mature stock. Each doe should have her own nursery, and be kept well supplied with fresh hay, especially when about to build her nest. When one kind of rabbit is kept, one buck will be sufficient for twelve to twenty does. He should be housed alone and great care bestowed upon him. He must be well fed, and kept in good condition by a day's run in the yard every week if possible. Stock should be first used for breeding purposes when from nine to ten months old, and should be fattened and killed at four to five years. Four litters a year will give the best results in strong, quick-growing stock.

Feeding.—The first meal should be given at sunrise and consist of corn-meal, boiled green bananas, or raw or boiled sweet potatos cut into bits, as much as can be eaten. Green food should never be fed damp, but always dried for a day. Rabbits will eat almost any kind of herbage, sweet potato leaves and stalks for preference; also Spanish needle, cowitch, pea leaves, yam leaves, turnip tops, coffee prunings, etc. At sundown, a handful of fresh hay, some more corn-meal or bananas and green food should be given. All the remains should be removed and the feeding vessels cleaned out.

To sum up:—Never neglect your rabbits, never startle them. In handling be very gentle, grasp both ears with careful firmness, placing the other hand beneath the hind legs. The flesh of well-kept rabbits is a valuable food, and quite a large stock could be reared at very little expense, especially if the owners plant bananas and sweet potatos and take the trouble to gather proper food.


Our Book Shelf.
Notes and Reviews.

JOURNAL OF THE BRITISH HONDURAS SOCIETY OF AGRICULTURE AND COMMERCE. Published at the 'Angelus' Printing Office, Belize. Price 10 cents.

It gives us considerable pleasure to offer a hearty welcome to this new journal. It is edited by the Secretary of the British Honduras Society of Agriculture and Commerce, and in the first number its object is stated, viz: 'to endeavour to disseminate useful information on questions of agriculture and commerce amongst all classes of the inhabitants of British Honduras for the purpose of assisting them in improving their positions, making their lands yield a good return, and instructing them how to prepare and cure their crops, so that the products of the country may bear a good name and command good prices in the markets of the world.'

The first number, dated July 1903, contains a report of the first annual general meeting, held on December 20, 1902, giving an account of the work done by the Society since its inauguration in March 1902, editorial notes, articles on Rubber, Cotton and Vanilla (*Vanilla planifolia* is a native plant found growing in nearly every district of British Honduras), and an abridgement of Mr. H. Maxwell-Lefroy's article entitled 'A New General Insecticide,' which appeared in the *West Indian Bulletin*, Vol. III, p. 319. The arrangement of this publication is very similar to that of the Jamaica Agricultural Society, and we hope that it will prove as useful to its readers.

ECONOMIC PLANTS OF PORTO RICO. By O. F. Cook and G. N. Collins. *Washington: United States Department of Agriculture, 1903.*

This useful compilation of the Economic Plants of Porto Rico is included in Vol. viii, part 2, of the 'Contributions from the United States Natural Herbarium' at Washington, D.C.

Mr. O. F. Cook is botanist in charge of investigations in tropical agriculture under the United States Department of Agriculture, and Mr. G. N. Collins is his assistant.

The list is arranged alphabetically, according to the Spanish local names. The information is, on the whole, reliable. In some instances, the scientific names are not those accepted by English botanists and are apt to confuse readers in these islands. For instance, the familiar Royal palm, *Oreodoxa regia*, appears under the barbarous name *Roystonea boringuena*; the West Indian Bay tree (*Pimenta acris*) is here given as *Anomis caryophyllata*, an obsolete name that no one will recognize. With these and similar exceptions the work is carefully compiled. The forty-eight full page illustrations are an important feature of this publication which, we doubt not, will serve a very useful purpose in making known the undoubted economic resources of Porto Rico.

INSECTICIDES AND FUNGICIDES.

The following list of the principal insecticides and fungicides, and notes as to their uses and adulterations, have been prepared by Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture for the West Indies:—

Paris green, London purple and Arsenate of lead, which are known as 'stomach poisons' are adapted for use against such insects, as are able to bite off portions of their food and swallow the fine particles. Any poison which may be applied to such food, would therefore be swallowed and have an opportunity of acting upon the insect.

These poisons would have no effect upon sucking insects, which merely penetrate the tissues of the plant or animal on which they feed, and suck out the juices from within. In dealing with them, a 'contact poison' must be used, such as soap solution, whale oil soap, kerosene oil and kerosene emulsion. Tobacco, hellebore and pyrethrum may also be included in this list. These contact poisons all act in the same general way, that is, by stopping up the breathing pores in the sides of the insect's body and thus causing suffocation. Carbon bisulphide and potassium cyanide are used against those insects that are difficult to reach with either stomach or contact poisons, such as borers, ants, underground insects, insects in houses, insects in grain bins, etc. These two insecticides are, however, poisonous, and their use, except by an expert or one well acquainted with them, is attended with considerable danger. Hellebore, pyrethrum, tobacco, lime and sulphur all have their uses both as contact and stomach poisons, but more especially as contact poisons for use against soft-bodied insects, such as grubs, sun-fly larvae, fleas, plant lice, etc. Of these, pyrethrum and tobacco are probably the most valuable.

Lime, sulphuric acid and copper compounds are the principal materials used as fungicides. The combination most generally employed is a mixture of lime and copper sulphate, known as Bordeaux mixture. The ammoniacal solution of copper carbonate is also well known as a fungicide. With the Bordeaux mixture any of the arsenical poisons may also be used, in which case one spraying will serve to destroy both insects and fungi. With the ammoniacal solution of copper carbonate, however, only the arsenate of lead should be used, since the ammonia has the effect of rendering the arsenic in Paris green or London purple more soluble, and the arsenic will be liable to cause the burning of the foliage of the plants.

The Bureau of Chemistry of the United States Department of Agriculture has recently issued a Bulletin (No. 68) giving analyses of a large number of the insecticides and fungicides offered for sale in America. These analyses show that great variation occurs in the composition of even such standard materials as Paris green and London purple. They further show that many of the patent preparations for the complete extermination of all insects and fungi contain nothing that could be of any value, either as an insecticide or fungicide, or even as plant food. Others are composed largely of some neutral material, to which a little tobacco, pyrethrum or some arsenical poison has been added. Bordeaux mixture can be purchased in the form of a dry powder. It is, however, better to prepare it as required, since chemical changes are liable to take place between the lime and the copper sulphate. Directions for the preparation of Bordeaux mixture may be found on page 37 of the Department Pamphlet No. 17, entitled *General Treatment of Fungoid Pests*; while Pamphlet No. 7 gives information on the preparation of insecticides.

GLEANINGS.

Nearly 20,000 economic plants and over 35,000 seedlings were distributed during the past year from the Grove Experiment Station, Montserrat.

The Department of Land Records and Agriculture, Madras, has issued a bulletin containing notes on 'simple machines for extracting plantain fibre.'

Two hundred and ninety-three crates containing 445 bunches of bananas were shipped from Barbados on the 1st. instant by the R.M.S. *Trent* for England. This is the largest shipment that has yet been made and it is hoped that the fruit will arrive in good condition and fetch remunerative prices. There were also shipped on the same date, twenty-four crates of mangos.

The cultivation of vegetables and other food products appears to have received considerable attention at the St. Lucia Agricultural School. Although only started seventeen months ago, the provision grounds of the school have already been able to supply all the vegetables required for the use of the pupils during the past year. Mr. Moore estimates that on this account a saving of about £37 10*s.* has been effected during the year ending March 31, 1903.

The *Board of Trade Journal* of April 9, 1903, says:—'As respecting the proposed light railway in British Honduras, it may be noted that the Colonial Secretary stated in his communication that, in the event of the proposed line being carried into effect, a banana plantation started on the line and gradually developed into a rubber and cacao estate, would, it is believed, prove a great success and yield a larger profit.'

The St. Croix *Avis* continues the publication of articles on 'Tropical Tobacco Growing.' The issues of July 22 and 25 deal with the fermentation and sorting of tobacco. Directions are given for regulating the fermentation by the careful use of the thermometer, and particulars as to the various grades of tobacco.

Reference was made in the *Agricultural News*, Vol. II, p. 183, to the cultivation of Vanilla in the Comoro Islands. It was stated that the plants were usually trained on 'pignon d'Inde' supports. It may be mentioned that according to Mr. F. Pastournel, who writes in the *Queensland Agricultural Journal* for June last, the 'pignon d'Inde' is the *Croton Tiglium* or croton oil plant. But this is evidently a mistake. The 'pignon d'Inde' is the common physic-nut tree *(Jatropha Curcas)*, which is used all over the world as a support for vanilla.

The imports of rice into British Guiana in 1895-6 were 49,262,831 ℔., the imports in 1900-1 were 20,399,683 ℔., or less than one one-half. The local production of rice during the four years 1897-1901 was 104,713,280 ℔., of the value of £500,000. There is apparently no reason why British Guiana should not produce all the rice required for its own consumption.

The Montserrat *Herald* of July 25, records the fact that, whereas in 1902, 115 acres were planted in cotton, this year there will be about 700 acres. On some estates the yield in 1902 averaged between 1,000 ℔. and 1,600 ℔. of seed cotton per acre; the prices realized for the cleaned lint were 10*d.* and 11*d.* per ℔., and it is understood that this gave a profit of over £5 per acre.

A course of instruction for school teachers was held at the Agricultural School, St. Lucia, from July 6 to July 18, 1903. Lectures and demonstrations were given by Mr. Moore, the Curator of the Botanic Station, and by Mr. Hudson, the Agricultural Instructor. The teachers, who were boarded and lodged at the school, passed a unanimous vote of thanks to Mr. Moore and Mr. Hudson for the very interesting course given them.

The *Times of India*, May 4, says: 'Mr. Maxwell-Lefroy, Entomologist appointed by the Agricultural Department of the Government of India, arrived in Calcutta last week. Mr. Lefroy's experience has been largely gained in the West Indies, and though insect pests, which trouble agriculturists in India, differ considerably from those in that quarter of the globe, training in a tropical country will give him immense advantage.'

The Agricultural Instructor at St. Lucia writes with reference to the cacao experiment plot at Beausejour Estate: 'The practical results at this plot have done more to strengthen my influence with landowners than years of talking and lecturing. Nearly every cacao proprietor in the vicinity has begun to fork and prune and upwards of 50 tons of basic slag and several tons of sulphate of ammonia were imported into the island for the first time for cacao cultivation.'

The State Entomologist, New Jeresy, in a report on mosquito, mentions that the cleanest and most effectual material for keeping off mosquitoes is oil of citronella. This oil is obtained from a grass, *Andropogon nardus*, and is used in the manufacture of cheap grades of perfumery. The odour is not unpleasant, is lasting, and effectually keeps off all kinds of mosquitoes. It may be applied on the hands and face or other exposed parts of the body. The use of citronella oil was discussed in the *Agricultural News*, Vol. II, p. 72.

The Government Analytical and Agricultural Chemist, Jamaica, in his annual report states:—Several samples of bees'-wax adulterated with 50 per cent. of wheaten flour and corn meal have been reported on. A local industry flourished for a time in Kingston, which bought up all the available supply of genuine bees'-wax, adulterated it with an equal weight of meal and sold it back again to merchants for export. The Police are now checking the sales of bees'-wax under the Adulteration Act. It is satisfactory to report that all country wax has been found genuine, and there is every reason to believe that the fraud was limited exclusively to the operations of a gang in Kingston.

ST. VINCENT.

Cotton and other Industries.

The following is the summary of an address delivered by the Imperial Commissioner of Agriculture, at a meeting of landowners and others at the Court House, St. Vincent, on Friday August 7 last:—

After a brief reference to the result of the conference held with the landowners and planters in June last, Sir Daniel Morris expressed his satisfaction with the thoroughly earnest manner in which cotton cultivation had been taken up in the colony. On one property more than 120 acres were likely to be established this season. On others, active efforts were being made to prepare and plant the land. He was glad to state that the promises made in June would be more than realized. At Bequia, the area proposed to be planted, in the first instance, was 5 acres only. It is probable now that at least 20 acres will be planted in that island. Altogether, including the Experimental Plots, the total area to be planted in cotton at St. Vincent by the end of September next would, probably, not fall far short of 500 acres. Considering the very short time available, this was a gratifying response on the part of the planters to the offer made to them by the Imperial Department of Agriculture.

It was impressed on those engaged in the planting of cotton that the land should be thoroughly broken up and kept in a good state of cultivation, that the plants should be 'moulded up' when 6 to 10 inches high, and, where exposed to strong winds, rows of pigeon peas should be planted to afford shelter.

The Central Cotton Factory to deal with this season's crop would be erected in Kingstown. It was proposed that the Factory, containing a set of ginning machines and a baling press, worked by steam power, would be ready in December next.

AGRICULTURAL SHOW.

Sir Daniel Morris then drew attention to the proposal to hold the first of a series of Agricultural Shows in St. Vincent, in January or February next. The buildings and grounds at the Agricultural School were believed to be well suited for the purpose. In order to obtain the best results it was important that the rules and list of prizes be published several months beforehand. The educational value of the shows would be the main object in view, that is, the exhibits were to be specially prepared for the show, and they should give evidence of care and skill in preparation; otherwise the show would be useless.

Sir Daniel Morris suggested the formation of Central and District Committees to carry out arrangements and give information to the people in the country districts. It was proposed to offer Diplomas of Merit for estate stock and produce, and money prizes for small stock and articles grown and produced by peasant proprietors. In addition, small money prizes would be offered for specimens grown and exhibited by children in elementary schools. In connexion with the latter point, it was mentioned, that three school gardens were already prepared for children attending the Kingstown schools on the grounds of the Agricultural School. In addition, school gardens were proposed to be attached to five or six schools in the country districts.

FRUIT INDUSTRY.

The prospects of fruit-growing were, Sir Daniel Morris hoped, improving. He was not in a position to state exactly what Mr. Symington's plans were, as regards St. Vincent. At present, it was understood he was confining his attention to Trinidad. He left last Saturday in R.M.S. *Trent* for England with fruit placed in a special cool chamber to test its value. There was no doubt that good bananas and pine-apples could readily be grown in this island. If Mr. Symington were prepared to establish a depôt here and purchase fruit from the growers as originally proposed, the people of St Vincent should avail themselves fully of the facilities offered them.

EDUCATIONAL.

St. Lucia.

The half-yearly examination was held at the St. Lucia Agricultural School at the end of June. The following is the general report of the examiner:—

The papers are, on the whole, much more satisfactory than those of December 1902. There is less verbal agreement in the answers, though this is still a matter that requires careful attention. All care should be taken that the knowledge of the boys is real and not a knowledge of note-books.

There is a very considerable uniformity in the results of the examination. Degazon, among the seniors, and Stedman, among the juniors, are, however, noticeably below the others. Both boys occupied low positions in the December 1902 lists. Allahdua has improved his position, and Lake has regained his. I should like to draw attention to the general excellence of the papers sent in by Vincent Goring. Among the new boys, de Boulay, Raveneau and Edgar would, doubtless, have obtained better marks had they not taken senior papers in Arithmetic and Geography; in spite of this, de Boulay is head of this class and deserves commendation. Andrew has also done very well, especially in the science subjects and the Arithmetic and Geography.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture for the West Indies embarked in R.M.S. *Esk* for St. Vincent on August 3, and returned to Barbados in S.S. *Dahomé* on August 9. During his stay in the island, Sir Daniel Morris visited the principal localities, where cotton cultivation is being carried on, as also several of the experiment stations. On Friday, August 7, he addressed an influential meeting of landowners at the Court House. A brief summary is given on this page.

Mr. Lawrence Lewton-Brain, B.A., Lecturer in Agriculture on the staff of the Imperial Department of Agriculture, proceeded to Grenada in R.M.S. *Esk* on August 3, to deliver the third course of lectures to teachers in charge of elementary schools in that colony. Mr. Lewton-Brain is expected to return to Barbados to-day.

Mr. George Whitfield Smith, F.L.S., Travelling Superintendent on the staff of the Imperial Department of Agriculture, has proceeded to Canada on three months' leave of absence from the 14th. instant. Mr. Whitfield Smith hopes to return to the West Indies in S.S. *Dahomé* due to leave Halifax on October 24, calling at Bermuda and the Northern Islands.

TRINIDAD.

Cocoa-nut Oil Industry.

The following interesting description of a cocoa-nut oil industry established in Trinidad, written by Mr. W. Greig, has recently appeared in *Industrial Trinidad*, a small volume issued by the Victoria Institute:—

The Cocoa-nut Oil Industry has, until recently, been little known to the general public, but owing to the proposed changes in our fiscal arrangements to meet the proposed Reciprocal Treaty with the United States which might affect it, it has come in for a good deal of attention. For many years past cocoa-nut oil has been made in Trinidad in small quantities, principally by small peasant proprietors who had difficulty in disposing locally of their produce in the shape of cocoa-nut, and not having the facilities of the larger proprietors for shipping. So long as the larger proprietors realized remunerative prices, they shipped their nuts, but with a gradually declining market for nuts they have had to turn their attention to the oil. Fifteen years ago cocoa-nut oil was imported into Trinidad, but since then this has ceased altogether, and we now export cocoa-nut oil to the annual value of £2,500. The growth of this industry has been slow, as by the ordinary local method of extracting oil from the nut, there was not a very high margin between the relative values of nuts and oil, and it must always take time before a purely agricultural industry will adopt machinery. By the most primitive method of extracting the oil, the kernel of the nut was grated on a cassava grater and boiled with water. The oil, which on boiling became separated and floated on the surface, was skimmed off. As the industry advanced and a larger output was necessitated, rotary graters took the place of the cassava grater, and 'teachers' or 'steam pans' were used for boiling, and in some cases old scum presses from the sugar estates were used to press the water from the resulting meal and render it available as a stock feed. The objections to this method were high cost in labour charges, inferior extraction and low value of the by-product, oil-meal. Some enterprising capitalists, not directly connected with the growing of cocoa-nuts and without the prejudices of the agriculturist against machinery, some years ago erected modern oil-extracting machinery in Port-of-Spain. They evidently overlooked the very serious disadvantages of high cost of transporting the nuts from where they grow, or, if transported in shell to reduce this cost, the loss of the husk as fuel which necessitates the uses of expensive coal. It is only since modern machinery has been erected at Mayaro and Cedros that the advantages of this industry have become apparent, and when those advantages are more generally known, I am satisfied that our export of cocoa-nut oil will entirely take the place of the cocoa-nuts exported now with considerable advantage to the colony. The average price realized for nuts during the past two years has been from $7 to $8 per 1,000; if made into oil by the most modern machinery, after deducting the cost and value of residual cake, the oil would cost 40 cents per gallon. The difference between that price and 50 cents, the average price oil has been sold at during the past two years, would be the profit to the manufacturer, or, if manufactured by the owner of the nuts, it would increase the proceeds of his nuts by $2·45 per 1,000. There is therefore a loss to the colony of almost $2·50 per 1,000 on the 12½ million nuts we now annually export, or over $40,000. The most modern process of extracting oil from the cocoa-nut is by hydraulic presses. Before pressing, the kernel of the nut must be broken up into as fine a meal as possible, and as this can only be done with the dry kernel, it is therefore necessary to make copra first. This can be done without the aid of artificial heat at Cedros or Mayaro, but not on our west coast or at Port-of-Spain. The copra is ground into as fine a meal as possible in a disintegrator, after which it is warmed and packed in small bags and is then subjected to a pressure of 2 tons to the square inch in the hydraulic press. An extraction of 48 per cent. from the copra is obtained by this first pressing. The cake from the first pressing, being comparatively dry, can now be ground a second time in the disintegrator into a very fine meal, after which it is again warmed and pressed, when a further extraction of 10 per cent. from the copra is obtained, making 58 per cent. in all. The residual meal amounting to 38 per cent. of the weight of copra is a first-class stock feed containing 11·50 per cent. fatty matter, and 10·50 per cent. moisture, for which there is an ample demand in the local market at 1½ cents per lb. By this process a relatively high extraction of oil is obtained at a low cost, and the residual meal is of high commercial value. The cost per gallon of oil extracted does not exceed 10 cents, in a small plant capable of an output of 100 gallons per day, including capital and depreciation charges as well as labour and supplies. The skill required to work oil presses is not beyond the intelligence of our ordinary mechanic, and for the following reasons the oil should be extracted as near where the nuts grow as possible:—

(a) To avoid heavy freight or transport charges—1 puncheon of oil being equal to 400 nuts. *(b)* Where husks and branches can be obtained no other fuel is necessary to work the factory. *(c)* Copra can only be made without the aid of artificial heat on the east and south coasts, where most of our nuts grow. The cost of putting down a modern oil extracting plant capable of an output of 100 gallons per day, or of working up a crop of 1,250,000 nuts would be about £1,000 to £1,200, and the following relative value of nuts, copra and oil, worked out from the results of such a plant, may be useful to any who propose going into this industry:—

Nuts per 1,000.	Copra per ton.	Oil per gallon.	
$10	$67·86	50 cents.	
9	61·73	46 ,,	After allowing for value of 5·6 lb. meal per gallon oil.
8	55·61	42 ,,	
7	49·48	38 ,,	
6	43·36	34 ,,	
5	37·23	30 ,,	

Soil Nitrification and Malaria. Professor J. P. d'Albuquerque sends the following note:—In a recent number of the *Lancet*, Dr. Arthur R. Waddell, M.D., contributes a paper on 'Soil nitrification and the incidence of Malaria and other mosquito-borne diseases.' The author states that one part of strong *liquor ammoniae* in four thousand parts of water is fatal to the mature mosquito larva, and concludes that the addition of nitrogen compounds to surface waters, through the medium of actively nitrifying soils, should prove an effective means of checking the multiplication of mosquitoes and of preventing malaria.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—July 21, 1903.—Messrs. KEARTON PIPER & Co., Messrs. HALES CAIRD & Co., Messrs. E. A. DE PASS & Co., 'THE PUBLIC LEDGER,' July 18, 1903, and 'THE WEEKLY COTTON CIRCULAR,' July 10, 1903.

ALOES—Curaçoa, 14/6 to 40/-; Barbados, 13/- to 35/- per cwt.
ARROWROOT—St. Vincent, $1\frac{7}{8}$*d.* to 4*d.* per lb.
BEES'-WAX—£7 17*s.* 6*d.* to £8 5*s.* per cwt.
CACAO—T'dad, 58/- to 67/- per cwt.; Jamaica, 48/- to 55/- per cwt.; Grenada, 50/- to 56/- per cwt.; Dominica, 48/- to 55/- per cwt.
CARDAMOMS—Mysore, 1/4 to 3/- per lb.
COFFEE—Jamaica, 34/- to 55/- per cwt.
COTTON—West Indian, $6\frac{3}{16}$*d.* to $6\frac{1}{2}$*d.* per lb.
FRUIT—
  BANANAS—6/- to 7/- per bunch.
  ORANGES—No quotations.
  PINES—Antiguas, 9/- to 10/- per barrel.
FUSTIC—Dull.
GINGER—Jamaica, 39/- to 68/- per cwt.
HONEY—Jamaica, 17/- to 22/6 per cwt.
ISINGLASS—West Indian, 1/6 to 2/7 per lb.
KOLA NUTS—1*d.* to 4*d.* per lb.
LIME JUICE—Raw, 1*s.* 3*d.* to 1*s.* 6*d.* per gallon. Concentrated, £15 10*s.* to £16 per pipe.
LOGWOOD—Jamaica, £4 to £4 12*s.* 6*d.*; Honduras, £5 10s. to £5 15*s.*
MACE—1/9 to 3/3 per lb.
NITRATE OF SODA—Agricultural, £9 10*s.* per ton.
NUTMEGS—70's to 75's, 1/5 to 1/7; 80's to 90's, 1/- to 1/3 per lb.
PIMENTO—$2\frac{1}{4}$*d.* to $2\frac{1}{2}$*d.* per lb.
RUM—Demerara, $9\frac{1}{2}$*d.* to 10*d.* per proof gallon. Jamaica, 1/7 to 1/8 per proof gallon.
SUGAR—Muscovado, 11/- to 12/6; Crystallized, 14/6 to 15/6 per cwt.
SULPHATE OF AMMONIA—£12 12*s.* 6*d.* to £12 15*s.* per ton.
TAMARINDS—Barbados, 11/6 per cwt.; Antiguas, 7/6 per cwt.

New York,—July 10, 1903.—Messrs. GILLESPIE BROS. & Co.

BANANAS—Jamaica firsts, $1·00; eight hands 70c.; seven hands, 45c. per bunch.
CACAO—African, $11\frac{3}{4}$c. to 12c.; Caracas, $12\frac{3}{4}$c. to $13\frac{1}{2}$c.; Jamaica, $9\frac{3}{4}$c. to $11\frac{1}{2}$c.; Grenada, 12c. to $12\frac{1}{4}$c.; Trinidad, 12c. to 13c. per lb.
COCOA-NUTS—Trinidads, $16·00 to $17·00; Jamaicas, $18·00 to $20·00 per M.
COFFEE—Jamaica, ordinary to good ordinary, 5c. to $5\frac{3}{4}$c. per lb.; Manchester grades, 8c. to 10c. per lb.
GINGER—Jamaica, $7\frac{1}{2}$c. to $8\frac{1}{4}$c. per lb.
PIMENTO—$4\frac{1}{2}$c. per lb.
RUBBER—Nicaragua scrap, $68\frac{1}{2}$c. to 69c. per lb.; Guayaquil strip, 62c. to $62\frac{1}{2}$c.
SUGAR—Muscovados, 89°, 3c. per lb.; Centrifugals, 96°, $3\frac{9}{16}$c.

INTER-COLONIAL MARKETS.

Barbados,—August 1, 1903.—Messrs. T. S. GARRAWAY & Co. and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, $3·75 per 100 lb.
CACAO—$12·50 per 100 lb.
COCOA-NUTS—$10·00 per M. (Husked Nuts).
COFFEE—Jamaica and ordinary Rio, $8·00 to $8·50 per 100 lb.
HAY—New Brunswick, 90c. per 100 lb.
MANURES—Nitrate of Soda $65·00; Ohlendorff's Dissolved Guano $60·00; Sulphate of Ammonia $85·00; Sulphate of Potash $67·00 per ton.
MOLASSES—18c. per gallon, and $4·00 for puncheon.
ONIONS—Madeira, $2·00 to $2·25 per 100 lb.
POTATOS, ENGLISH—$2·47 to $3·00 per 100 lb.
RICE—Ballam, $4·50 per bag (190 lb.); Patna, $3·50 per 100 lb.; Rangoon, $2·80 per 100 lb.
SUGAR—In hogsheads. $1·25 per 100 lb., and $5·00 for hhd. In bags, $1·50 per 100 lb.

British Guiana,—July 30, 1903.—Messrs. WEITING & RICHTER.

ARROWROOT—St. Vincent, $9·50 to $10·00 per barrel.
CACAO—Native, 11c. to 12c. per lb.
CASSAVA STARCH—$9 00 per barrel.
COCOA-NUTS—$8·00 to $10·00 per M.
COFFEE—Rio and Jamaica, $10\frac{3}{4}$c. to 11c. per lb. (retail).
—Creole, 11c. to 12c. per lb.
DHAL—$3·15 to $3·25 per bag of 168 lb.
EDDOES—$1·68 per barrel.
MOLASSES—Vacuum Pan, yellow, 16c. per gallon, casks included.
ONIONS—$1\frac{1}{2}$c. to 2c. per lb.
PEA NUTS—Curaçoa, $3\frac{3}{4}$c.; American, 5c. per lb. (retail).
PIGS—Young Boars and Sows, $5·00 each.
PLANTAINS—20c. to 40c. per bunch.
POTATOS, ENGLISH—$3·50 per barrel.
RICE—Ballam, $4·70 ex store; Patna and Seeta, $5·60 to $5·75 per bag.
Creole Rice, 20c. per gallon (retail).
SWEET POTATOS—Barbados, 84c. per barrel.
TANNIAS—$2·40 per bag.
YAMS—$1·92 to $2·88 per bag.
SUGAR—Dark Crystals, $1·86 to $1·87; Yellow, $2·25 to $2·40; Molasses, $1·70 to $1·90 per 100 lb.
TIMBER—Greenheart 32c. to 55c. per cubic foot.
WALLABA SHINGLES—$3·00 to $5·00 per M.

Trinidad,—July 30, 1903.—Messrs. GORDON GRANT & Co., and Messrs. EDGAR TRIPP & Co.

BALATA—Venezuelan, 41c. per lb.
CACAO—Ordinary, $11·75 to $12·00; Estates, $12·75 per fanega.
COFFEE—5c. to 6c. per lb.
ONIONS—$1·90 to $2·00 per 100 lb.
POTATOS, ENGLISH—$1·80 per 100 lb.
RICE—Yellow, $4·20 to $4·35; White Table, $5·50 to $5·80 per bag.
SUGAR—White Crystals $3·25 to $3·50; Yellow Crystals for local consumption, $2·10 to $2·25 per 100 lb.
—Molasses sugar, $1·80 to $2·00 per 100 lb.

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[46.]

"CACAO."

BY

J. H. HART, F.L.S.

NEW EDITION.

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COMMERCIAL CACAO.

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REPORTS

ON THE

Botanic Station, Agricultural School, and Land Settlement Scheme at St. Vincent, for the year 1902-3.

ALSO

REPORT

ON THE

Experiment Station, at Tortola, Virgin Islands, for the year 1902-3.

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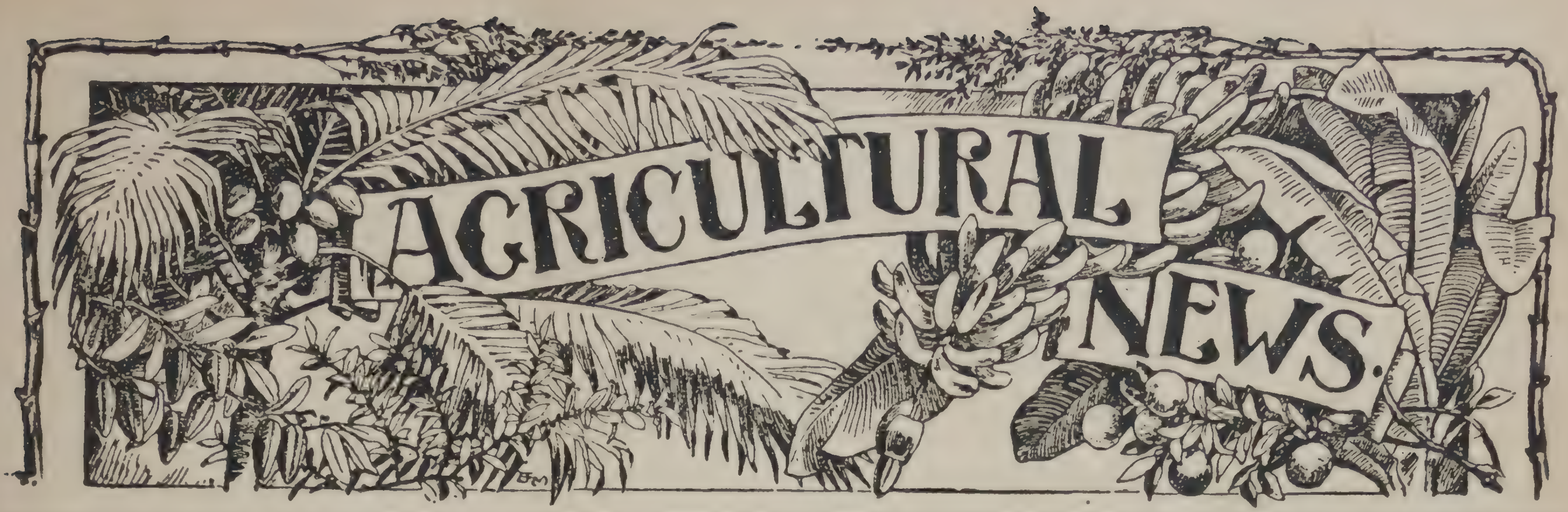

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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West Indian Agricultural Conference.

OWING to quarantine, due to the outbreak of small pox at Barbados, and lasting for over a year, no Agricultural Conference was held in January 1903. This was a disappointment to many, and it deprived the Department of the opportunity of advancing several subjects of interest in these colonies. Further, the meeting was to have been held at Trinidad a colony that would have afforded facilities for studying the cacao and sugar industries, the interesting collections of trees at the Botanic Gardens (one of the oldest in the West Indies), the Experiment Station at St. Clair, the Government Stock Farm and several Educational Institutions, all, more or less, of an agricultural character.

The question now to be considered is: Will it be possible to arrange an Agricultural Conference at Trinidad in January 1904? Barbados at this moment is free of quarantine, but the situation is no less difficult, because this and other colonies now impose quarantine against Trinidad. It is possible that the cause of quarantine against Trinidad may be removed before January 1904. In that case there would be no reason why the Conference, postponed this year, should not be held in that island in January 1904.

Hitherto, as our readers are aware, all the West Indian Agricultural Conferences, on account of its central position, have been held at Barbados. Owing to the fact that the several steamers of the Royal Mail Company, including the Atlantic and intercolonial steamers, have for many years foregathered in Carlisle Bay, once in each fortnight, Barbados has always been a convenient meeting place for representative bodies in the West Indies. It would still be so regarded, but for the change that has recently been made, whereby all the Atlantic steamers of the Royal Mail Company now call at Trinidad. In consequence of this arrangement the homeward-bound steamer, with passengers from Jamaica and Trinidad, arrives at Barbados later than formerly on Saturday mornings, and the outward-bound steamer leaves Barbados earlier on the following Monday afternoons. The result is that instead of allowing, as formerly, three clear days, representatives at any future Agricultural Conference held at Barbados would only have a portion of the day on Saturday and another portion of a day on Monday. It is evident, therefore, that under present arrangements, and, depending entirely on the movements of the Royal Mail steamers, it will be impossible to hold the Agricultural Conference, as hitherto, on the Saturday and Monday between the mails, at Barbados.

It has been suggested that the movements of the Canadian Mail steamers might be utilized for the purpose. These, in any case, would only suit representatives from the northern and southern islands. They would be of no service to representatives from British Guiana and Jamaica. The latter must always depend on the Royal Mail steamers for direct communication with the other colonies.

Practically, therefore, the question whether an Agricultural Conference can be held in 1904 depends on whether Trinidad will, at that time, be free from quarantine.

The details of a meeting at Trinidad could be arranged later. In the meantime it would be useful for those likely to attend, to give careful consideration to such subjects as would be desirable to bring forward for discussion, and the means whereby they could be fully dealt with. A Conference, if held at Trinidad, will, probably, last for several days, and there should be ample opportunity for meetings as well as for visits to institutions and points of interest.

At the meetings themselves there would be several subjects likely to afford topics for discussion. The cultivation of Cotton has suddenly acquired so much importance in these colonies, that it must naturally occupy a prominent place. There are numerous problems connected with this industry in which all the Colonies are directly concerned. Another important subject is the Onion industry. Besides these, we have the question of establishing a fruit trade in bananas, pine-apples, oranges and mangos between the Lesser Antilles and the United Kingdom. What has been already done in this direction at Barbados is full of promise, provided suitable facilities are afforded for shipping the fruit, so as to ensure its arrival in good condition. Other subjects desirable to be ventilated are the cultivation of the best rubber trees, the cultivation of cassava as a source of starch, the improved cultivation of cacao, in view of the increased production of African cacao, the cultivation of ground nuts for the production of oil and ground nut meal, the improvement of the Bay oil industry, and many others.

It is evident that there is no lack of subjects to be presented for the consideration of the next West Indian Agricultural Conference. The difficulty, at present, is to arrange for a convenient meeting place.

Our hope is that the circumstances at Trinidad will, eventually, admit of its being held in that island. In that case, we should be justified in anticipating for the Conference of 1904 thoroughly successful results.

SUGAR INDUSTRY.

Sugar-cane Experiments at British Guiana.

The following is a progress report on the sugar-cane experiments in British Guiana, prepared by Professor Harrison, C.M.G., M.A., F.I.C., F.C.S., F.G.S., the Government Analyst and Deputy Chairman of the Board of Agriculture, for the half-year ended June 30, 1903:—

1. During the period under review the sugar-cane experiments have been carried on under my control, assisted by the advice of members of the sugar-cane experiments Committee of the Board of Agriculture. The actual conduct of the work devolved upon Mr. R. Ward, Agricultural Assistant in charge of sugar-cane experiments.

2. During January a new series of plots on the North field were planted with varieties of canes for experiments with nitrogen and with varieties of phosphates, basic slag and basic superphosphates.

Supplies of varieties of canes from the plots on the South field were distributed to applicants.

General agricultural work was pressed on during the month. The experiment plots, reaped in December 1902, were forked and, where necessary, supplied. Certain selected varieties of seedlings, raised between 1892 and 1895, were replanted for experiments on more extended scales than hitherto.

The canes on the Brickdam field were not supplied, as one of the objects in view in the experiments carried on on this field is to test the ratooning powers of the varieties cultivated on it. They were manured with sulphate of ammonia applied at the rate of 2 cwt. per acre.

The weather during January was rather dry, 5·38 inches of rain being registered, but the majority of the canes on the experimental fields did not suffer.

3. In February the general work was similar to that of January, the weather continued somewhat dry, 1·95 inches of rain having fallen during the month. On the North field the ratooning of the varieties on the manure experiment plots was recorded as follows :—

Name.	Character.	Name.	Character.
No. 625	Very good	No. 115	Fair
„ 95	Good	„ 2,956	Moderate
„ 116	Good	„ 145	Unsatisfactory
„ 74	Good	„ 109	Unsatisfactory
„ 130	Fair	„ 78	Poor

Similar observations on the Brickdam field are shown comparatively as follows, the best ratooning varieties being valued at 10 :—

Cane.	Value.	Cane.	Value.	Cane.	Value.
Po-a-ole	10	No. 117	8	No 754	8
White Transparent	9·5	„ 3,866	8	„ 1,896	7
Mani	10	„ 135	8	„ 109	7
No. 1,905	10	„ 1,184	8	Bourbon	6
„ 130	10	„ 132	8	No. 4,132	6
„ 2,468	10	„ 115	8	„ 3,287	6
„ 147 B.	9	„ 1,880	8	„ 125	6
„ 1,483	9	„ 2,028	8	„ 4,399	6
„ 1,859	9	„ 102	8	„ 145	6
„ 2,190	9	„ 1,143	8	„ 3,873	5
„ 1,087	9	„ 625	8	„ 1,640	4
„ 116	8	„ 3,157	8	„ 4,192	4

No. 2,468 showed the finest strand of all kinds, growing with strong vigorous shoots and broad leaves. As recorded, the majority of the selected varieties showed superior ratooning powers to the Bourbon.

4. During March the weather was more favourable for plant growth than during the two preceding months, 7·82 inches of rain being recorded. Operations were carried on energetically, special attention being given to cleaning the drains in readiness for the later wet season.

Observations were made as to the attacks of cane borers on selected varieties. In the Brickdam field only 84 shoots were found injured by this pest over an area of 3 acres. At the North field they were far more prevalent and the following shows the number of shoots injured per acre of each kind :—

Cane.	Shoots per acre.	Cane.	Shoots per acre.
No. 145	325	No. 95	470
„ 115	320	„ 130	506
„ 78	320	„ 74	530
„ 109	350	„ 625	555
„ 116	360	„ 3,956	690

All the injured shoots were cut out and burnt.

5. Early in April selections were made of the most vigorous of the 1902 seedlings. The following shows the varieties from which seedlings were selected and the area in roods planted with seedlings obtained from each sort :—

Parent varieties.	Roods planted.	Parent varieties.	Roods planted.
No. 625	240	No. 117	54
„ 1,087	198	„ 754	48
„ 115	120	„ 132	48
„ 145	102	„ 147B.	48
„ 130	84	Bourbon	42
„ 109	66	No. 2,468	30

6. The weather during part of the month of April was too wet for satisfactory field-work ; 8·84 inches of rain were registered. From 9 a.m. on April 6 to 9 a.m. on the 7th., 4·77 inches of rain fell at the canefield and gave an opportunity of testing the efficiency of the re-arranged drainage system. Under former conditions a rainfall of this magnitude swamped the field and agricultural operations had to be suspended for several days. By the morning of the 9th., the water in the drains in the field had assumed its normal level and the land was in cultivable condition, thus proving very conclusively the very great benefit the cultivation has undergone from the alterations and extensions in the drainage system of the field and Botanic Gardens.

It having been decided to revert to the system first adopted, but which of recent years had been abandoned by the late Superintendent of the Botanic Gardens, of making the first selection of new seedlings about twelve months after they had been planted in the fields, a commencement was made of the selection by cultural and chemical characteristics of the seedlings raised in the autumn of 1901.

7. *May.* The selection of the 1901 seedlings was completed, 259 out of 4,800 being selected from their cultural characteristics as worthy of chemical examination. 127 of these were regarded as satisfactory and have been re-planted, 47 others being reserved for renewed examination towards the end of the year.

During this month the weather proved exceptionally heavy, 17·28 inches of rain being recorded. The drainage worked very satisfactorily and the land remained in cultivable condition. In consequence of the rain, the grass and weeds grew vigorously and much labour had to be expended to keep their growth under subjection.

His Excellency the Governor, accompanied by the Imperial Commissioner of Agriculture, visited the canefield on May 27, and on May 30 the field was inspected by the Commissioner.

(To be Continued.)

Sale of Yellow Crystals as Demerara Sugar.

A correspondent writes to the London *Times* as follows : Some time ago, a neighbour of mine gave me a swarm of bees, and, owing to the continuous rainfall, I found it necessary to feed them with cane sugar, and in this instance I gave them what I had bought as Demerara sugar. Seeing that they had no other food or possible chance of getting any through the pouring rain, I was very much astonished to find that they turned this out of the hive, and I was further surprised to find that these amber-coloured crystals did not readily dissolve, though wet with rain. I therefore submitted some of the crystals to chemical tests, and found they were not cane sugar at all. Now, I have been informed that yellow crystals are manufactured in Germany to imitate Demerara sugar, and this ‘sham’ sugar is largely sold in this country, and used chiefly by the poor.

GREEN LIMES.

From the *West India Committee Circular* we take the following remarks upon limes:—

In a letter to the *Standard*, of July 16, Mr. George Hughes pointed out the advantage of green over the yellow limes. The rind of the green lime contains a most pleasant essential oil, which gives the delicious, refreshing flavour to the palate. The volatile oil is lost by evaporation as the fruit ripens and turns yellow. The limes can be packed when very green in clean sand and will then be found to arrive in a satisfactory condition, though of course this form of packing adds to the cost of freight. Green limes in this country cost about 4*d*. a dozen, and we are of opinion that if concerted action were taken by the lime growers of the West Indies, either through the medium of the large restaurants or caterers, to popularize the fruit, much good would result, for it is an admitted fact that after a lime squash, the lemon squash appears mawkish and unpalatable.

THE MANGO: ITS CULTURE AND VARIETIES.

Indian Planting and Gardening of July 11 has an interesting article suggesting the improvement of mangos by hybridizing. Much might be done along similar lines in the West Indies:—

To any one who has seen the mango grown in other countries, it must be matter for much speculation, why a fruit so highly prized by all and sundry, has not been crossed and hybridized to improve it. Perhaps it may be argued that the varieties of mango already in cultivation are sufficient for all practical purposes. This may be so, but were the hybridist to take the matter in hand, some extraordinary results would follow. It is, however, a fact which does not admit of doubt, that hybridizing for the improvement of existing varieties of fruits, flowers and vegetables, has made very little progress in India. Indeed, with the exception of a few flowering plants, such as Cannas, Amaryllis and perhaps a few more, hybridizing is not practised in India. The Rev. T. Firminger, in the introduction to his book on *Indian Gardening*, writes: 'No efforts have been made to improve the races of plants indigenous to the country; no attempt, by any of the more refined processes of science, to produce superior varieties. It has been stated that the fine varieties of mango, for which one locality in Bombay is famous, have resulted from the skill bestowed upon their culture by Europeans, who first settled in that part of India—an assertion that rests upon very slender foundations. This is the only instance, I believe, where it is even pretended that an improved variety of fruit has been produced in India by the art of the cultivator.' The foregoing remarks stand good to-day.

Will any one question that a cross between the well-known varieties of 'Langra' and the ordinary 'Bombay' mango would not be an improvement upon the parents, having the characteristics of both? Yet, has anyone tried the experiment? Again, a cross between the large 'Malda' (so gorgeous and tempting to look upon, but poor in flavour) and the 'Langra' or 'Bombay' would probably result in a fruit, having the size and beauty of the 'Malda,' with the flavour of the two latter. The fact remains that no attempt has yet been made to produce new varieties of mango by cross-breeding and selection. I cannot understand why this kind of work cannot be undertaken at such centres as Calcutta, Bombay, Saharanpore, Allahabad, Agra and Lucknow, in the Government gardens. All the facilities are at hand, good men are in charge of the gardens, and time and money are of no consequence. However, I hope that the foregoing observations will catch the eye of the proper authorities, and that steps will be taken to make an organized effort to improve at least one of India's principal fruits.

WEST INDIAN MOLASSES IN CANADA.

The following information respecting West Indian molasses in the Dominion of Canada has been furnished by Mr. J. Russell Murray, formerly of Port-of-Spain, Trinidad, recently appointed Correspondent for the Imperial Department of Agriculture at Montreal:—

The largest consumption of molasses is in the Maritime provinces, and especially among the French districts of Quebec, Montreal, as well as, in Nova Scotia. West of Kingston, Ontaria, New Orleans molasses begin to appear, and in the neighbourhood of Hamilton, Ontaria and further west they predominate. This is caused by the cost of transit over 1,200 miles of railway on British West Indian molasses arriving at Halifax. The quality of New Orleans molasses is much below anything shipped from the West Indies and can hardly be used as a table syrup, though used by bakers and confectioners in their products. Its nominal use is for stock. Cuban molasses were in favour, as also, Porto Rico, but both of these have given way to the Barbados product, which now holds first rank. Trinidads are not looked upon with the same favour, as they lack flavour and brightness. There is an excellent market for molasses of high grades, and a very profitable market for the well prepared product. Can you not induce some of the planters to prepare a refined syrup? There is a splendid market for it. It could be shipped in bulk and tinned in 1 lb. or 2 lb. tins for table use.

COTTON.

Improvement by Seed Selection.

The following interesting letter from the Washington correspondent of the *New York Herald*, of June 25, deserves the careful attention of those who have embarked in cotton cultivation in the West Indies:—

An article by Mr. Herbert J. Webber, physiologist in charge of the plant-breeding laboratory in the Department of Agriculture, on 'Improvement of cotton by Seed Selection,' in the year book of the Department of Agriculture, published to-day, contains suggestions which, if generally adopted, would lead to a large increase in the cotton production of the United States. The extent to which it is possible by the adoption of scientific methods is shown by the fact that, while the average yield of cotton in the United States is only about 190 ℔. of lint per acre, yields varying from 500 ℔. to 800 ℔. per acre are frequently obtained on many large, carefully cultivated tracts. Mr. Webber does not believe that it is possible to greatly increase the acreage devoted to cotton in the United States. He says there is little opportunity for extending the industry into new regions, and while a much larger acreage of cotton could be grown in the old cotton-producing States, if necessity demanded it, there is a tendency in those States toward diversified farming rather than further specialization in cotton production. He concludes, therefore, that the most important problem now before cotton growers seems to be that of increasing the production on the same acreage, rather than extending the acreage itself. He thinks that, while cotton growing in other countries is capable of being considerably extended, such extension will doubtless be slow and will only slightly affect the industry in this country, and that the American planter should strive, by the application of improved methods and machinery and the use of improved varieties of cotton, yielding more and better staple, to keep well in advance of competitors in foreign countries, where cheaper labour is available.

Mr. Webber recognizes that the character of the soil is the factor of greatest importance. He believes, however, that there is great opportunity of improving the industry on all lands, both good and poor, and he estimates that the cotton crops could be doubled, on the same acreage now grown, by proper attention to two factors necessary to success, namely, the universal use of good seed cotton and careful methods of tillage and fertilization. While both of these factors contribute largely to success, Mr. Webber believes that the importance of good seed is probably more commonly overlooked than the matter of cultivation. His observations show that fully half the planters use seed taken at random from public gins, about which they know nothing other than that it was produced somewhere in the same vicinity; and he says: 'As well might the breeder of fast trotting horses introduce dray animals into his stables, or the breeder of intelligent hunting dogs introduce ordinary mongrel curs into his kennels. The use of good seed and its production by a regular system of selection is just as important a factor in the production of the crops as that of cultivation. No intelligent method of farm management disregards the production and use of good seed. The day, when growers can afford to plant any sort of cotton seed, has passed. Only seed of a known variety, selected because of its desirable qualities and adaptability to local conditions, should be planted.'

The traditional belief that an occasional change of seed is necessary, if good crops are to be regularly secured, is attacked by Mr. Webber, who contends that, to secure the best results, plants must be bred and adapted to soil and climatic conditions, and that cotton planters and growers of cereal crops as well, if they are to obtain the best results, must select their seed in the locality where it used to be regularly grown, in order to adapt it to the particular soil and climatic conditions.

The paper outlines a system of selection based on the principle that, while plants reproduce their main characters unchanged, and the stability of the cultivated plants and natural species depends upon this law of heredity, still they are not absolutely fixed and stable, but are very unstable and highly variable in minor characters. The system outlined, which is one that any planter can carry out on his own plantation, is based on the use of the seeds of only such plants as show the characteristics which it is desirable to reproduce—such as quantity of production, length of fibre and earliness of maturity. It is recommended that, after these plants have been carefully selected, the seed from the middle pickings of each plant be carefully gathered; that that from each plant be ginned separately, in a gin that has been carefully cleaned so as to prevent mixture of unselected seed, and that the seed of each plant be planted separately the following year, so as to test its quality for the reproduction of the qualities desired to be perpetuated. All plants that do not come up to the standard are to be discarded in the second year, and the seed of only the very best are to be used for planting the third year. By the beginning of the fourth year a sufficient supply of highly selected seed for seeding a large plantation will be secured. The system of selection can be indefinitely continued, however, from year to year on a tract of ground set apart for that purpose, and thus the quality of the cotton can be kept to a high standard or constantly improved.

Mr. Webber makes an important suggestion as to the possibility of combating the Mexican cotton boll weevil by seed selection. In examining fields of upland cotton in different parts of Texas, he observed occasional individual plants, in badly infected fields, that had set and matured almost all of their bolls, while adjoining plants were almost denuded. Whether such plants possess a degree of resistance or not, and whether this possible resistance will be transmitted to their progeny, he says, remains to be determined; but he thinks it probable that some plants may be discovered and propogated which will be distasteful to the weevils. He tells of experiments in Texas in 1901 and 1902 with varieties of Egyptian cotton for the purpose of noting the effect upon them of the boll weevil. The weevil was found to be destructive of all the varieties observed except the Mit Afifi cotton. Three acres of this variety were grown on land where the crop had been destroyed by weevils the previous year. About 200 feet distant was a small patch of upland cotton. The weevils appeared on the upland cotton early in the season and almost entirely destroyed it. They did not appear on the Mit Afifi until the middle of October, and damaged it very little. The Mit Afifi yielded about 1,066℔. per acre, while the upland variety yielded about 200 ℔. per acre. This was in spite of the fact that the upland cotton was much earlier than the Egyptian, and would normally be expected to produce a much larger crop in the boll weevil district owing to this fact.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 287 of this issue.

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NOTES AND COMMENTS.

Rearing of Ducks.

The last of the special articles contributed by Mr. John Barclay, Secretary of the Jamaica Agricultural Society, on the rearing of ducks appears in this number. It is probable that these will be followed by a few articles on the care and rearing of rabbits. Subsequently, it is proposed to issue the information in a collected form as one of the Department pamphlet series.

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Rubber from Dominica.

A sample of *Castilloa elastica* rubber, sent to the Department from the Botanic Station, Dominica, was forwarded by the Imperial Commissioner of Agriculture to New York and London, for a report and valuation. The report received in reply from New York was:—'With fine Para quoted at $1·00 per ℔., such rubber as your sample would bring 80c. per ℔., and if put on the market by one accustomed to selling rubber for specific uses, it might bring more. An excellent point about the rubber is its freedom from moisture and tarry spots.'

It is suggested that further experiments with the *Castilloa* trees be carried out with special instruments, such as those described in the last issue of the *Agricultural News*, and that the rubber be kept entirely free from dirt and bark.

Notes on Dominica.

These notes, containing hints for the information of intending settlers at Dominica, prepared by the Administrator, his Honour H. Hesketh Bell, C.M.G., are being issued to-day by this Department, as No. 24 of the pamphlet series. The pamphlet will be on sale by agents of the Department in the United Kingdom and throughout the West Indies. Price 2*d*. Post free 2½*d*.

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Onion Industry.

In order that experiments in growing onions in these colonies might be carried on successfully, the Imperial Department of Agriculture has recently imported a large quantity of fresh seed from the Canary Islands. In addition to what has been ordered direct for Montserrat, it is estimated that sufficient onion seed is now being distributed at cost price, to plant over 100 acres. At a moderate computation, an acre planted in onions should yield 4,000 ℔. of marketable produce. The total yield of onions, proposed to be grown at Barbados, Montserrat and Antigua during this season, should, therefore, not be less than about 400,000 ℔. or 8,000 crates of 50 ℔. each. The gross value of these, shipped to New York, would be about $120,000. The essential point to be remembered is that West Indian onions, to obtain good prices, must reach the New York market before March 20, or they will have to compete with onions shipped from Bermuda and Cuba. As an idea of the extent of the trade in onions with New York, it may be mentioned that, not many years ago, Bermuda in one season exported onions to New York to the value of £84,000.

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The Eradication of Plant Diseases.

The *Tropical Agriculturist* of July discusses the question of the eradication of the cacao canker, to whose ravages in Ceylon we referred in our last issue. It is suggested that the time has come for legislation to protect private property from injury through the neglect of one's neighbour, unless some voluntary co-operative action is taken. It is very truly pointed out that an estate upon which a disease of this kind is allowed full play, very soon becomes a serious danger to other plantations, especially those in its immediate vicinity. It appears that in Ceylon there are planters who have a keen outlook kept for this pest and efforts taken to maintain the trees in a healthy condition; but, naturally, their efforts must be to a great extent nullified by the carelessness of neighbours, who pay no attention to the warnings of the Mycologist and others.

In drawing the attention of planters in the West Indies to the position of affairs in Ceylon in connexion with this pest, we would point out that there would be no need for legislation, there or elsewhere, if individual planters would carry out the practical advice of scientists, who have made a special study of the particular disease affecting their crops.

Shipment of Cotton to Liverpool.

In the *Agricultural News*, Vol. II, p. 178, the advantage of consigning cotton direct to Liverpool or Manchester in order to save the heavy railway charges from Southampton, was pointed out. In this connexion Messrs. Booker Bros., McConnell & Co., British Guiana, agents for the Liverpool line of Steamers, have written to the Imperial Commissioner of Agriculture as follows:—

'We understand that there is no direct line of steamers between the island of Barbados and Liverpool, and in view of the development of the new cotton growing industry, which is being promoted in the island at your instigation, we beg to say that we are prepared to let any of the homeward bound boats of our Liverpool line call at Barbados, or any of the neighbouring islands, for any freight that may be offering, provided, of course, that the amount would warrant the deviation. We usually have three-weekly sailings for Liverpool during our crop season, and at other times you could usually depend on there being a steamer once a month.'

Notes on Phosphate Manures.

In the *Bulletin of the Department of Agriculture, Jamaica,* for July, Mr. H. H. Cousins, M.A., Government Analytical and Agricultural Chemist, writes on the subject of phosphate manures. Planters are urged to avoid the complete fertilizer of commerce and to mix their own manures according to the requirements of the particular soil and crop. This is advocated not merely on account of the saving thereby effected, but chiefly because it enables the planter to get the form of fertilizer suited to the particular type of soil. This is of the greatest importance in the case of phosphate manures, of which there are in the market three chief forms, viz: Basic slag, basic phosphate and mixed phosphates. With regard to these, Mr. Cousins states: 'Basic slag is frequently absolutely inoperative on calcareous soils, while superphosphate may result in detriment to the crop, if applied to soils deficient in carbonate of lime. Again, there are some soils representing the lighter lands of our fertile alluvial tracts in Jamaica, where basic slag would be inoperative, superphosphate injurious and an intermediate or mixed phosphate would be the form best adapted to the nature of the soil.'

The following observations are made with reference to these three forms:—

'*Basic slag:* the best form for clay soils, deficient in lime.

Superphosphate: undoubtedly the best phosphate for use on soils containing adequate carbonate of lime.

Mixed phosphates: a mixture of superphosphate and steamed bone flour, for the majority of alluvial soils and those deficient in carbonate of lime.'

Sugar Trade with Canada.

From Messrs. Sandback, Parker and Company's Demerara circular of July 15, we abstract the following information with reference to the increase of trade in sugar between British Guiana and Canada:—'In the year 1900, 78,400 tons of sugar were exported to the United States; from January 1, 1903 to July 14, 1903, 31,782 tons. The amount of sugar exported to Canada in the year 1900 was 924 tons, while from January 1, 1903 to July 14, 1903, the amount was 19,782 tons.' Under the head of freight, the circular states 'there is no freight offering for the United States; all the sugar is being shipped to Canada.'

The Canadian Exhibitions.

Exhibits of economic and other products have been sent from several of the West Indian colonies to the Canadian Exhibitions. Reports have been received from St. Vincent, Antigua and Montserrat, giving in each case a list of exhibits sent. Each colony is also assisting in the decoration of the Court by sending palm leaves, bunches of cocoa-nuts, etc.

A collection of exhibits for the Toronto Exhibition was made by Mr. Powell, Curator of the Botanic Station, St. Vincent. The collection was forwarded by the S.S. *Oruro.* The shipment included six samples of arrowroot, samples of sugar, cacao, kola nut, farine and cassava cakes. There were also thirty-one samples of Bitter wood cups made by a local turner from the Quassia tree *(Picraena excelsa).* Various ornamental seeds such as Job's tears *(Coix lachryma)* and Circassian beads *(Adenanthera pavonina)* were likewise included in the exhibit.

The Acting Secretary of the Antigua Agricultural Society reports that four boxes were shipped by the S.S. *Oruro,* two for the Toronto Exhibitions and two for Ottawa. These boxes contained over fifty exhibits, including samples of rum, lime juice, molasses, honey, preserved fruits, starches, cotton, tobacco, etc.

The Agricultural Instructor, Montserrat, sends the following report:—

'Trade samples of the following products were shipped per S.S. *Oruro* for the exhibition to be held at Toronto:—

Molascuit, cotton lint, cotton seed, bay oil and honey.

The molascuit, cotton lint and cotton seed were put into white cotton bags and the name of the product was stencilled in ¾ inch lettering about half way down and 'From Montserrat' stencilled near the bottom so that when the bags are opened and stood up, the name of the product and origin can be seen at a glance by visitors. The honey and bay oil were sent in white glass jars. Two crates of palms were sent from the Grove Station to be used for decorative purposes in the exhibition building.'

In addition to these shipments, as stated elsewhere, in this issue, large exhibits have been sent from Jamaica. The Government has voted £50 for the purpose, and it is intended to keep a permanent exhibit in Toronto.

INSECT NOTES.

St. Vincent.

The following extracts are taken from a report prepared by Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, after a visit to St. Vincent in June last:—

I made a very careful examination of the plants in the nurseries and garden at the Botanic Station. Many of the common scale insects were present, but the only ones numerous enough to be noted here are the following:—

On small cinnamon plants the Mealy Shield scale *(Protopulvinaria pyriformis)* was quite abundant. The small size of the plants will allow of their being dipped, and this insect ought to be easily controlled.

Nutmeg plants were attacked by *Lecanium mangiferæ*, the Mango Scale.

Palms were attacked by the Black Line scale *(Ischnaspis filiformis)*, which is to be found on palms everywhere. Upon the coffee plants were found the common Shield scale *(Lecanium hesperidum)* and the Black Line scale *(Ischnaspis filiformis)*.

The nutmeg and the coffee plants are in beds near a large mango tree, and this is probably, to a large extent at least, responsible for their infection. Mango trees are always more or less infested by scale insects, their enormous size making them difficult to treat, and they would, without doubt, cause plants growing beneath to become infested.

In the garden, the trees and plants were mostly in a very healthy and vigorous condition, and in most instances it was only by careful search that the scale insects were found. The star apple, which is always affected by scale insects, was attacked by the Brown Shield scale *(Lecanium hemisphaericum)* and the Mealy Shield scale *(Protopulvinaria pyriformis)*. The Brown Shield scale was also found upon the avocado pear.

The spraying outfit of the Botanic Station includes a 'Fruitall' sprayer, with truck, hose and extension rod, all in good condition; a 'Success' Knapsack sprayer (nearly new and in good condition); extra nozzles and hose for both of these; a garden syringe and an atomizer. For insecticides, there are whale oil soap, rosin, sulphur and kerosene.

At the Agricultural School a plot of cotton was examined and insects were found. These included a red bug with black wings *(Dysdercus annuliger)*, similar to the Cotton stainer of the Southern United States; two species of Green Bugs (not determined), and a large golden weevil with dark stripes, similar to the Root borer of the sugar-cane *(Diaprepes abbreviatus)*, described by the Rev. N. B. Watson (*West Indian Bulletin*, Vol. IV, p. 37).

It is not known how much damage these insects do to the growing cotton. The weevil was found on a great variety of plants and in some cases much more abundantly than on the cotton. This cotton was in a remarkably healthy condition and showed very little effect of the work of the insects present.

The Agricultural School has a 'Knapsack' sprayer, nearly new and in good condition.

While at St. Vincent I gave two lectures to the pupils of the Agricultural School, one on insects in general, and the other on injurious insects, and methods of combating them.

ONION CULTIVATION.

It is desirable to remind those who have received onion seed, ordered by them through the Imperial Department of Agriculture, that the first sowings should be made as soon as possible.

It is far more economical, and safer in the long run, to sow the seed in well-prepared nursery beds, and not out in the field. The nursery beds might be conveniently established near the dwelling house, in a sheltered situation and close to a water supply. They would then be under constant observation and watered when necessary. The beds should be raised about 1 foot or 18 inches and barrelled in the centre. The soil should be specially prepared and well pulverized. The onion seed is so small, that when the soil is not reduced to a fine powder, a large share of the seed will fail to germinate. A keen look-out must be kept for ants which are sometimes troublesome. The seed is advised to be sown in drills across the beds about 6 inches apart.

In order to avoid losing the seed by being washed out by heavy rains, it is recommended to sow at intervals, say a week apart, from now to the end of September. When possible, the seed beds might be protected from heavy rain by being sheltered by a cheap thin cloth, similar to that known as 'cheese cloth.' The shading could be tacked to laths and placed on posts about 4 feet or 5 feet over the beds. The shading should be occasionally removed as the seedlings get stronger, until they are sufficiently hardened to be planted out in the field. We hope to return to this subject later. In the meantime it would be of service, if the officers of the Department were prepared to afford all possible assistance to those who are embarking in onion growing, and explain carefully the conditions necessary for success. Agricultural Instructors are particularly desired to take part in this work.

Further information on onion cultivation may be obtained from pamphlet (No. 16), issued by the Imperial Department of Agriculture and on sale by all agents throughout the West Indies. Price 2*d*.: free by post 2½*d*.

RESEARCH LABORATORY AT JAMAICA.

We learn that the buildings at the Hill Garden at Cinchona, Jamaica, have been leased by the Government to the Director-General of the New York Botanic Garden for the use of research students connected with that establishment. This is an excellent proposal in the interest of botanical work in the West Indies. We hope something on similar lines will be carried out at Trinidad and Dominica, where the conditions are eminently favourable for the scientific investigation of tropical vegetation. While we are devoting a large share of attention to economic plants, we must not lose sight of the purely scientific side on which, after all, all true progress in agricultural matters depends.

HURRICANE IN JAMAICA.

As announced in the public telegrams, a destructive hurricane swept over a large portion of the island of Jamaica on August 11. It is said to have covered a section of country 80 miles in breadth. The loss of life has been considerable, several steamships were washed ashore and the banana and other industries are paralysed. The hurricane was followed by deluges of rain. The total damage to property, according to New York telegrams, is estimated at $10,000,000.

At a public meeting held in the Council Chamber at Bridgetown on Thursday last, his Excellency the Acting Governor in the Chair, the Imperial Commissioner of Agriculture made the following observations in seconding a resolution, expressing sympathy with the sufferers by the Jamaica hurricane and urging the desirability of immediate assistance being extended to them:—

Sir Daniel Morris, in rising to second the resolution, said he did so the more readily, because his first experience of a West Indian hurricane (that of August 1880) was gained in Jamaica. He then realised the suffering entailed on cultivators and others, and the difficulties they had to contend with for many months before they obtained the means of subsistence. He arrived at Barbados and went on to St. Vincent shortly after the hurricane here in 1898. He had also spent some days in Montserrat after the hurricane of 1899, and witnessed the dire calamities that followed there. His official connexion with various parts of the West Indies and his belief that this island, badly off as it is, could still do something to help Jamaica, was his excuse for appearing before them that day. Although exact details were not to hand, he had spent seven years in Jamaica and knew the circumstances of its people. When fuller news arrived, he ventured to say, they would find that thousands of the poorer people of Jamaica had lost all they possessed. A circumstance likely to intensify the calamity was, that for nearly a year before the hurricane there had fallen little or no rain. Therefore, the crops must have been scanty for some time. That must accentuate the suffering caused by the hurricane, because there was nothing to fall back upon in the way of ground provisions. In his opinion immediate assistance was needed, and he trusted that the several colonies would all help according to their abilities. He did not think it necessary, if he did, he would plead earnestly for the extension of sympathy by the people of this island to the people of Jamaica. It was well known that in the days of their prosperity, the people of this island had contributed handsomely on occasions of calamities befalling the sister colonies. At the present time, they might not be in a position to contribute a large sum of money, but he would suggest that they could help in another way, by making gifts of provisions. He thought the people of this island might contribute gifts of sweet potatos, and these might be sent to Jamaica by the Royal Mail Steamers. If possible, some might be sent by the next steamer. Each estate in the island could assist with a few barrels or bags of these roots. There might also be sent peas, yams and yam heads, if not too late in the season. It was most desirable, when a people like those of Jamaica were overtaken by a calamity like this hurricane, that they should be afforded, as soon as possible, the means of restocking their provision grounds. Usually the first relief given took the form of barrels of corn meal and biscuits, but he did not think these the most useful. Such gifts might satisfy immediate wants, but gifts that afforded the distressed the means of restocking their provision grounds, were far more valuable They would thereby be placed in the position of again living on the produce of their grounds, as they had been accustomed to. He hoped that a committee would be appointed to promote the course of action he had advocated. He had received a letter from Jamaica in which it was stated that sweet potatos were being sold at 5 ℔. for 5*d*. That related to a condition of affairs existing previous to the hurricane, and showed that at that time ground provisions were scarce, and the people were suffering from the want thereof. Sweet potatos were specially abundant here, and if, in addition to what might be done in other directions, those who were able to give potatos and other ground provisions, immediately contributed them, they would thereby show, not only their anxiety to give, but their pratical sympathy with the island. He did not think it was necessary for him to make lengthy remarks. He had risen to second the resolution put by Dr. Chandler. Barbados should do, and would do, he was sure, something of a useful and practical character to help the people of Jamaica in their present distress. (Cheers.)

AGRICULTURAL SOCIETIES.

Nevis.

A public meeting of planters and others interested in agriculture was held at Nevis on July 9, for the purpose of forming an Agricultural Society. The Chairman, Mr. C. A. Shand, made the following remarks:—

In an island like Nevis, which depends entirely upon agriculture, the necessity for the establishment of an Agricultural Society is so obvious, that I confess I was disappointed upon my advent here, to find that such a body was non-existent. I do not propose, therefore, to take up more of your valuable time than is absolutely necessary in advocating the claims of an institution, which I am sure you are all as anxious to support as myself. Nevis is most unfortunately situated so far as means of communication, both internal and external, are concerned. Consequently there must of necessity prevail here a stagnation of ideas, so to speak, which is not calculated to promote the best interests of the community at large. A society such as it is now proposed to inaugurate will, I am sure, infuse fresh life into the planting body and, if properly kept up, will go far towards developing a new era of prosperity in insular agriculture. It is already apparent that the old 'all the eggs in one basket' policy is doomed, and that it must give place to a more rational system in which, whilst sugar will always remain the staple crop and mainstay of the island, subsidiary industries will spring up side by side and receive their fair share of attention. I now formally move that 'The Nevis Agricultural Society' be opened to the enrolment of members, and I will conclude with the hope that the same success which has attended the work of its sister Society in Antigua, with which I was so intimately associated from the time of its inception, may be achieved by the youngest member of the family now seeing the light in Nevis.

Coffee Substitutes. Reference was made in a previous number of the *Agricultural News* to various seeds that are used as substitutes for coffee. *The Home and Colonial Mail* of June 19, mentions that Soja beans are put to a similar use. These beans are cultivated by the German settlers in Meherrin, Virginia, and their use is to a large extent superceding that of coffee in that district. They are the seeds of *Glycine hispida*, which is cultivated throughout China and Japan where it is grown for food purposes or for the sake of the oil extracted from the seeds.

REARING OF DUCKS.

In the present article, which concludes Mr. Barclay's series of notes on the 'Rearing of Ducks,' the ailments of ducks are dealt with.

SICKNESS.

Ducks have few troubles when full grown, but in ducklings we find some of that tenderness common to all young birds. They are, however, much hardier than chickens, turkeys, or Guinea-chicks, and can look after themselves better. The chief trouble is a chill through getting wet, and consequently, young ducks must be kept as dry as possible, until they get feathers. This may seem foreign to their aquatic nature but reasons for it have already been given. In domestication their nature, habits and constitution are very much changed, and it is likely to be fatal for ducklings to get their down wet and draggled and then to be exposed to the hot sun and, later on, to the chilliness of night. They are to be kept, therefore, out of the wet grass in the morning, provided with shade from the sun during the day, and at night sent dry to a comfortable bed. I have never found ducklings, which were allowed to swim as they pleased, to be any the worse, but rather perhaps somewhat the better, for the natural exercise, *provided* they were at night put into a comfortable dry nest of dried grass with the mother-hen. Ducks, unlike chickens, leave their foster mother-hen before she is willing to part with them. It is then that they are liable to get ill, as they will squat for the night on the cold, wet ground rather than in the best nest. However, it will probably be safer to keep the ducklings from getting their down wet and draggled, until it is superseded by feathers. Still, if care is taken to see the ducklings comfortably housed at night, I believe they may be allowed to follow the natural instinct to swim and forage on the water, as it makes them hardier and stronger.

The other troubles ducks are subject to, are mostly digestive, that is, through errors in feeding. When a duck ails, looks droopy and refuses food, half a teaspoonful of Epsom salts, dissolved in a tablespoonful of water, should at once be given. Give it in the morning (not in the evening as with fowls), and follow in the evening with half a teaspoonful of castor oil and the same quantity of salad oil (cocoa-nut, cotton-seed, olive, pea-nut and sunflower oils are all suitable), and the next morning a teaspoonful of pure sweet salad oil. After an interval of forty-eight hours, the oil mixture, that is, castor and sweet oils in equal proportion, should be given again in the evening, followed in the morning with the sweet oil alone. Afterwards, the half-teaspoonful of Epsom salts should be given once a week. In fact, if once in each week Epsom salts are mixed with the soft food, in the proportion of a half-teaspoonful to each duck, and an exact allowance of half an ordinary man's handful of this food given to each bird, troubles will be to a great extent prevented.

In digestive complaints I include liver troubles caused through feeding too fattening a diet. Be sparing with corn, cornmeal and cocoa-nut in feeding the breeding stock. Encourage the ducks to forage for themselves as described under 'Feeding,' and this will prevent liver diseases, which are very common in hot countries. The forage heap is a grand institution for either ducks or fowls, because by mixing grain with it, worms, beetles and grubs of many kinds are soon found in it. The birds enjoy these, flourishing on the mixed diet.

Ducks do not suffer from the insect pests, which are so troublesome to fowls, except when ducklings are being hatched under hens. Then the great poultry pests, 'fowl lice', must be guarded against by placing in the nest among the straw, a piece of camphor (penny squares can be bought at any drug store). The napthalene balls sold under the name of 'Camphor Balls' are of no use whatever in keeping off insects from anything. A few drops of kerosene, turpentine, or eucalyptus oil placed around the edge of the nest every week, will also keep off lice.

Ducks do not suffer much from Roup and are more easily cured of it than fowls.

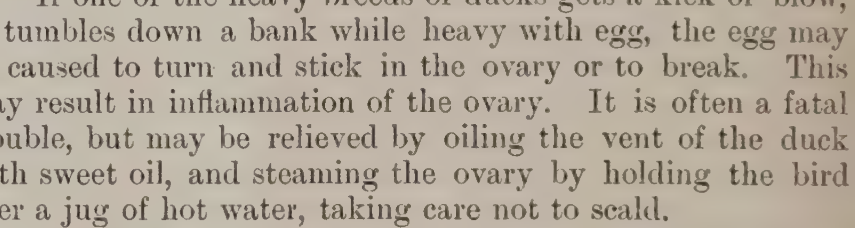
Whenever watery matter is observed in the eyes or at the nostrils of ducks, put a pellet of permanganate of potash in half a pint of water (the merest pinch of the reddish powder will do), and this makes what is known as 'Condy's Fluid'. Dip the duck's head into the water and dry the eyes and nostrils with a clean rag. It is as well to wash out the roof of the mouth also.

If one of the heavy breeds of ducks gets a kick or blow, or tumbles down a bank while heavy with egg, the egg may be caused to turn and stick in the ovary or to break. This may result in inflammation of the ovary. It is often a fatal trouble, but may be relieved by oiling the vent of the duck with sweet oil, and steaming the ovary by holding the bird over a jug of hot water, taking care not to scald.

On the whole, duck-rearing is more simple than the rearing of fowls and should be more taken up in wet climates such as are often met with in the West Indies.

THE BETA RUBBER KNIFE.

We give an illustration of a knife for tapping rubber trees, brought out by Messrs. Thomas Christy & Co., Old Swan Lane, Upper Thames Street, London, upon the design of Mr. J. H. Hart, F.L.S., Superintendent of the Botanic Department at Trinidad. The price is 42s. per dozen. The principal advantages of this knife are stated by Messrs. Christy & Co., as follows:—



1. The blade can be set to cut at any required depth; therefore it is only necessary to ascertain at what depth the lactiferous cells are situated and to regulate the knife accordingly.

2. The tree can be tapped more often than is now advisable, the damage done being very slight as compared with the customary methods.

3. A larger amount of pure milk is obtained from any variety of tree, and the quality of rubber is much enhanced.

AGRICULTURAL SHOWS.

British Guiana.

A successful show was held at Friendship on Monday, August 10. The show was opened by his Excellency Sir J. A. Swettenham, who in his address urged upon the people the necessity for improvement in agricultural operations. He spoke of the desirability of the people residing upon their holdings and recommended the planting of coffee, cacao and cocoa-nuts. His Excellency also drew attention to the suitability of the district for rice and cotton cultivation.

The exhibits, which were divided into six classes—plants, fruits, vegetables, economic products, poultry, and arts and manufactures—were, on the whole, good and showed signs of improvement. Special prizes, given by his Excellency, were awarded for the best kept kitchen garden and the best kept cocoa-nut cultivation of one acre. There were, however, no entries for the special prizes of $50·00 each for the best samples of well-cured vanilla and clean Para rubber.

Jamaica.

Two largely attended Agricultural Shows were held in Jamaica on Monday, August 3. We take the following extracts from the Jamaica *Gleaner* of August 5:—

The annual show of the St. Ann's Agricultural Society, for which great preparations had been made, was held at 'Thickets' on Monday last. Heavy rains fell early on Monday morning and frequent showers fell up to mid-day. Nevertheless there was a large turn out of persons on the show grounds, and with a sixpenny gate, a larger sum was drawn than at any previous show. The gate money was said to be £59 13*s*. 6*d*. His Excellency Sir Augustus Hemming spent about an hour going through the various exhibits, and remained in the ring the whole afternoon. An address was presented to his Excellency on behalf of the St. Ann's branch of the Agricultural Society.

There were 149 entries for horse-stock events. There were also large entries in the cattle classes.

In the minor products section there was a considerable turn out of exhibits and a very large shed could not hold them.

Perhaps the finest display of all was the citrus fruits, the quality of which it would be hard to surpass. The oranges especially were magnificent, Mr. H. Q. Levy taking first prize.

A very great advance has been made in the way that the people present their exhibits.

The Show at New Market (St. Elizabeth) was a success in every particular. The attendance was much larger than on the last occasion, and the weather was, on the whole, all that could be desired.

The staple and minor products were said by experts to be the very best displayed at any Agricultural Show as yet in the island. The school exhibits were of a high standard and reflected great credit on the teachers.

IMPORTANCE OF AGRICULTURE IN AMERICA.

We reproduce below, from the Report of the Secretary of Agriculture in the United States for 1902, an extract giving the aggregate value of the produce of American agriculture for 1899 and subsequent years. This should be stimulating to agriculturists in the West Indies, as it indicates the results that might also be expected to follow the intelligent application of improved methods to West Indian agriculture:—

In 1899, according to the census returns, the produce of American agriculture, including farm animals and their products, had an aggregate value of nearly five billion dollars. Some of the crop values that make up this total were almost startling in their size. The crop of Indian corn, which formed the leading item, had a value of 828 million dollars. The hay and forage of the census year were worth 484 millions. Wheat, which ranks next to corn among our cereal crops, gave a return of 370 millions, while oats were produced to the value of 217 millions. Cotton, the great crop of the Southern States, was valued at 324 millions.

In addition to these foremost crops, there were numerous others yielding returns in value that ran into the millions. Live stock and their products formed an exceedingly important factor in the grand total. The animals sold and slaughtered during the year were valued at above 900 millions. The several products of the dairy—milk, butter and cheese—comprised an item of 472 millions, while poultry and eggs together brought a return of over 281 millions.

As a result of the intelligent application of improved methods to American agriculture, the produce of our farms has enabled us to increase the volume of our exports every year. Products of agriculture form about two-thirds of our entire export trade. Last year the exports from the farm amounted to 860 millions of dollars. The science of agriculture is in rudimentary stages in all lands. The education of producers from the field, so long neglected, has recently been undertaken in earnest in the United States. Our Government is doing more for the farmer than all other nations combined. Results are justifying expenditure, and the future will still further show the value of science applied to the farm.

Interesting Sand from Brazil. Monazite sand is an interesting export from Bahia in Brazil. The value of the sand, as taken from the sea-shore, is £25 per ton, but the part of it that is particularly sought for, viz: thorium, is worth £90. Besides being used for incandescent lighting, according to the *Board of Trade Journal*, it is said to be used in Germany in the manufacture of smokeless powder, of which it is said to increase the projective power.

Professor d'Albuquerque writes: 'Monazite is a phosphate of the cerium metals in combination with a silicate of thorium. It occurs in small grains and crystals in gneissic rocks especially in Brazil. From it is prepared thorium oxide, which, with zirconium oxide, is used for coating the Welbach incandescent gas mantles. I can find no record of the occurrence of monazite in the West Indies.

It would be interesting if the various volcanic and other sands in the West Indies were to be systematically examined. In the Virgin Islands it has been stated that some of the sands there are of vegetable origin and produced from the limestone deposits of certain algae (corallines).

GLEANINGS.

The *Revue des Cultures Coloniales* of July 20, 1903 contains a resume of the article on 'Green Sorghum Poisoning,' which appeared in the *West Indian Bulletin*, Vol. III, p. 326.

According to *Indian Planting and Gardening*, experiments made by a well-known planter with arsenite of soda as a weed destroyer, go to show that it is very effective in eradicating the sensitive plant *(Mimosa pudica)* and *Cyperus rotundus* or nut grass.

Speaking of the proposal to hold an Agricultural Show in December next, the St. Vincent *Times* of August 6 says:—'These Agricultural Shows undoubtedly arouse interest amongst many whom we have no other means of reaching, and always tend to elevate the peasantry by inducing them to bestow greater attention upon their products.'

A correspondent writing in the *Chemist and Druggist* states that Ceylon papain is very frequently adulterated; various starchy matters and even the milk from the wild cactus being utilized for this purpose. It is pointed out that in order to fetch a good price, not only must this product be free from all adulterations, but also manufactured with scrupulous cleanliness.

The *Annual Report of the Agricultural Department, Zanzibar*, for 1902, states that the total number of vanilla plants under cultivation at Dunga is 15,117. It is expected that another 8,000 will be planted this year. Between the end of August and the middle of December 36,269 flowers were fertilized; native boys trained at Dunga performed most of this work, under the supervision of one or two Seychelles men.

At the last meeting of the Board of Management of the Jamaica Agricultural Society, the Secretary reported that he had sent nine cases of exhibits for the Canadian Exhibitions. One case for Toronto contained material for a 'permanent exhibit, at the Commercial Rooms.' Of the £50 allotted, the sum of £39 had been spent, the balance to be expended on a fruit exhibit. In addition to the purchased exhibits, a large number of voluntary exhibits had been sent.

According to the Demerara *Argosy* of August 1, locally-grown balata, amounting to 18,501 ℔. and valued at about $7,500, was despatched to England by the Mail Steamer on Thursday. Foreign balata shipped amounted to over 32,000 ℔. According to the returns received at the Custom House from Morawhanna, 36,534 ℔. of balata collected on Venezuelan territory were shipped to Georgetown for the month of July, an increase of nearly 18,800 ℔. as compared with the previous month.

A Bill has been introduced in the Cuban house of representatives to raise the duty on American starch. This step is taken to encourage farmers to cultivate the native yuca or cassava plant, and to induce capitalists to erect machinery in different sections of the island for the manufacture of starch for export as well as local consumption.

The Jamaica *Gleaner*, August 5, speaking of the Agricultural Show at Thickets, says: 'There was a larger display of goats than usual, which is promising, for this is a class which seldom has much attention paid to it at shows. There were one or two really good animals, and a great deal of preparation had evidently been made to get them into show form.'

The *Sugar Planters' Journal* states:—'Sugar-cane grows luxuriantly in Nicaragua at an elevation of 4,000 feet, some 10,000,000 ℔. of sugar being manufactured last year. There is sufficient cane grown, however, to double that sugar output, the other half of the cane acreage being devoted to the manufacture of rum, which in 1902 amounted to 469,845 gallons.'

The *Board of Trade Journal* of July 2 states: 'According to a despatch received from H.M. Consul at Stettin, a British firm is now erecting at Sydowsau, near Stettin, a factory for the production of artificial silk from wood pulp by a new process. The pulp is treated with chemicals, pressed by hydraulic power through minute tubes into a further chemical bath, after which the finished product is spun. It can be woven into any desired fabric, which is said to be equal to fine silk.'

A correspondent writes:—'As the result of the proposals to get rid of the mungoose, it would appear that there is a disposition on the part of a few to dwell on its one or two good qualities and endeavour to keep it with all its attendant drawbacks. As a compromise it is suggested that a reward should be offered for the destruction not only of the mungoose but also of rats. The idea is a good one, if it were possible to carry it out. The question is: Are funds available for a crusade against both mungoose and rats?'

The Curator reports that considerable injury has been caused to the Botanic Station by the severe gale that visited Dominica on Saturday night August 8 and Sunday morning August 9 last. About fifty trees, some of large size, were up-rooted, and scores of others have been damaged. The experiment plots of kola, limes, nutmegs and coffee have also suffered. The cacao escaped fairly well, except where the shade trees were blown over. At the Agricultural School on the Morne, the capping and spouting to the buildings were injured. Some of the lime estates in the southern portion of the island are said to have suffered.

The Toronto *Mail and Empire* for July 20, publishes the account of an interview with Dr. H. A. Nicholls, C.M.G., of Dominica. Speaking of the lime trade, Dr. Nicholls mentioned that besides the export of the fruit, large quantities of juice were shipped to New York to be used in the manufacture of citric acid. Dr. Nicholls advocated the promotion of closer trade relations between Canada and the West Indies, pointing out that there was no reason 'why Canada should, for example, import winter fruit from California and the Mediterranean, when better fruit could be secured from Dominica and her sister islands, at less cost.'

MOSQUITO PLANTS.

In a recent issue of the *Agricultural News* (Vol. II, p. 182), we had a note regarding the basil plants. We take the following from *Nature* of July 30:—

At the beginning of this year Mr. A. E. Shipley directed attention in these columns to the widely spread belief, that a basil plant *(Ocimum viride)* provided a means of protection against mosquitos. Observations made by Captain H. D. Larymore at Lokoja, Northern Nigeria, seemed to show that the belief was well founded, but Mr. Shipley pointed out that further experiments were needed upon the subject. The article was reprinted in the *British Medical Journal*, and was referred to by many other periodicals; and in consequence requests for seeds of the plant were received at the Royal Gardens, Kew, from many parts of the world. Sir William Thiselton-Dyer has, however, sent to the *Times* of July 27 a report of experiments made on the basil plant in relation to its effect on mosquitos by Dr. W. T. Prout, at Freetown, Sierra Leone, and he remarks that it 'appears to dispose conclusively of the plant's possessing any real protective value.' The conclusions arrived at by Dr. Prout as the result of his experiments are:— (1) Growing plants have little or no effect in driving away mosquitos, and are not to be relied on as a substitute for the mosquito net. (2) Fresh basil leaves have no prejudicial effect on mosquitos when placed in close contact with them. (3) The fumes of burnt basil leaves have a stupefying, and eventually a destructive effect, on mosquitos, but to retain this action a degree of saturation of the air is necessary, which renders it impossible for the individual to remain in the room. It is probable, however, that cones made of powerful basil would, when burnt, have the effect of driving mosquitos away, and to this extent might be found useful.

CENTRAL COTTON FACTORY.

The Central Cotton Factory was opened at Barbados on July 31. Since August 4, seed-cotton has been received from Kent, Joe's River, Foursquare, Bushy Park, and Hannays plantations and also from Dodds. The experience at Barbados, as elsewhere, has been that, when the seed-cotton has been carefully gathered, is fully matured and presented in a perfectly dry condition, no difficulty need be anticipated in cleaning it with the Macarthy, double action, single roller gin.

With the seed-cotton in the best condition, this single machine has cleaned as much as 55lb. of lint per hour. The out-turn with all kinds of cotton, naturally, is below this figure; but there is no reason why, at any time, it should fall below an average of 40 lb. of lint per hour. The baling press is manufactured by G. D. Colton & Co., Galesberg, Ill., U.S.A. It is worked by hand and will turn out three bales weighing about 200 lb. each per hour.

At a recent meeting of the joint Committee of the Agricultural Society and the Imperial Department of Agriculture, it was resolved to obtain extra gins to meet the requirements of planters and, in fact, render the factory capable of dealing with all the cotton likely to be produced at Barbados during the year 1903-4.

EDUCATIONAL.

Grenada.

THIRD COURSE OF LECTURES TO TEACHERS.

Mr. L. Lewton-Brain, B.A., Lecturer in Agriculture on the staff of the Imperial Department of Agriculture, delivered the third course of lectures to Primary School teachers at Grenada from August 5 to Wednesday August 12. An examination was held at the close of the course. Twenty-three teachers attended the lectures and of these nine were placed in the First class and fourteen in the Second class.

Referring to these lectures his Honour the Administrator writes:— 'The best thanks of this Government are tendered to the Imperial Department of Agriculture, and to the Lecturer, for the good work done and assistance rendered in this connexion.'

Jamaica.

We have received the *Annual Report of the Education Department of Jamaica* for the year ended March 31, 1902. The printing of this report has evidently been considerably delayed and much of the information relating to agricultural education has already been published (*West Indian Bulletin*, Vol. III, p. 99).

With regard to school gardens, the Superintending Inspector of Schools writes: 'I believe many schools are taking up this work which has, as I stated in my last report, a distinct educative influence on the whole district round each school where it is carried on.'

We take the following extracts from the report of the Inspectors in reference to the teaching of agricultural science in the Elementary schools:—

Progress is made in the schools in teaching this subject to an extent that is encouraging. A considerable display of growing plants in pots and boxes is now usual at inspections. Some teachers are following intelligently the 'Notes, suggestions and experiments' prepared for them and are profiting by the lectures of Mr. Buttenshaw. I have been pleased to recognize some successful efforts to cause the children to observe and conduct experiments for themselves. (Mr. Hicks).

Teachers often urge that they have difficulty in getting the information they are required to impart. Mr. Watts' new book, *Nature Teaching*, will remove this difficulty. (Mr. Williams).

DEPARTMENT NEWS.

The Hon'ble Francis Watts, Government Analyst and Agricultural Chemist for the Leeward Islands, who proceeded to England on April 8 last, in connexion with the establishment of a Central Sugar Factory, returned to Antigua on August 19 last.

Mr. W. N. Sands, Curator of the Botanic and Experiment Stations at Antigua, returned from leave of absence and resumed the duties of his appointment on the 19th. instant.

MARKET REPORTS.

London,—August 4, 1903.—Messrs. Hales Caird & Co., Messrs. E. A. De Pass & Co., Messrs. Kearton, Piper & Co., 'The Public Ledger,' August 1, 1903; and 'The Weekly Cotton Circular,' July 30, 1903.

Aloes—Curaçoa, 14/6 to 40/- ; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, $1\frac{3}{4}$*d.* to 4*d.* per ℔. Bermuda, 1/3 to 1/10 per ℔.
Balata—1/11 to 2/6 per ℔.
Bees'-wax—£7 12*s.* 6*d.* to £8 5*s.* per cwt.
Cacao—Trinidad, 58/- to 67/- per cwt. ; Jamaica, 48/- to 56/- per cwt. ; Grenada, 48/- to 57/6 per cwt. ; Dominica, 48/- to 56/- per cwt.
Cardamoms—Mysore, 1/4 to 3/- per ℔.
Coffee—Jamaica, 33/- to 55/- per cwt.
Cotton—West Indian, $6\frac{3}{16}$*d.* to $6\frac{1}{2}$*d.* per ℔.
Fruit—
  Bananas—6/- to 7/- per bunch.
  Oranges—Jamaica, 10/- to 11/- per case.
  Pines—Antiguas, 9/- to 10/- per barrel ; Jamaicas, 10*d.* to 1/4 each.
Fustic—£3 to £5 per ton.
Ginger—Jamaica, 39/- to 68/- per cwt.
Honey—Jamaica, 16/6 to 24/6 per cwt.
Isinglass—West Indian, 1/- to 3/- per ℔.
Kola Nuts—1*d.* to 4*d.* per ℔.
Lime Juice—Raw, 1/- to 1/3 per gallon. Concentrated, £15 10*s.* to £16 per pipe.
Logwood—Jamaica, £4 to £5; Honduras, £5 10*s.* to £6 15*s.* per ton.
Mace—1/9 to 3/3 per ℔.
Nitrate of Soda—Agricultural, £9 10*s.* per ton.
Nutmegs—70'*s* to 75'*s*, 1/6 to 1/7 ; 80'*s* to 90'*s*, 1/- to 1/4 per ℔.
Pimento—$2\frac{1}{4}$*d.* to $2\frac{1}{2}$*d.* per ℔.
Rum—Demerara, $9\frac{1}{2}$*d.* to 11*d.* per proof gallon. Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—Jamaica, coarse to fair 1/- to 1/2 ; ordinary grey to good red, 7*d.* to 1/1 per ℔.
Sugar—Muscovado, 11/- to 12/6 ; Crystallized, 14/9 to 16/- per cwt.
Sulphate of Ammonia—£12 12*s.* 6*d.* to £12 15*s.* per ton.
Tamarinds—Barbados, 10/6 to 13/- ; Antiguas, 7/6 to 9/- per cwt.

Halifax, N.S.,—July 29, 1903.—'The Maritime Merchant.'

Bananas—$2·00 to $2·25 per bunch.
Cocoa-nuts—$3·50 per 100.
Hay—$12·00 to $15·00 per ton.
Lemons—No quotations.
Molasses—Porto Rico, 42c. per gallon ; Barbados, no quotations.
Onions—New Spanish, $2\frac{1}{4}$c. per ℔.
Oranges—Jamaicas, $7·50 per barrel ; Californian seedling, $4·50 per case.
Pine-apples—$3·00 per dozen.
Potatos—New, $3·50 per barrel.
Tomatos—$1·50.

St. John, N.B.,—July 29, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 42c. to 44c. ; Barbados, 37c. to 40c. per gallon.

New York,—August 7, 1903.—Messrs. Gillespie Bros. & Co., and Messrs. James Lee & Co.

Bananas—Jamaica firsts, 90c. to $1·00 ; eight hands 60c. to 70c. ; seven hands, 35c. to 40c. per bunch.
Cacao—African, $11\frac{1}{2}$c. to 12c ; Caracas, $12\frac{3}{4}$c. to $13\frac{1}{2}$c. ; Jamaica, $9\frac{5}{8}$c. ; Grenada, 12c. to $12\frac{1}{4}$c. ; Trinidad, 12c. to 13c. per ℔.
Cocoa-nuts—Trinidads, $24·00 to $25·00 ; Jamaicas, $23·00 to $25·00 per M.
Coffee—Jamaica, ordinary to good ordinary, 5c. to $5\frac{3}{4}$c. per ℔. ; Manchester grades, 8c. to 10c. per ℔.
Ginger—Jamaica, $7\frac{1}{2}$c. to $8\frac{1}{4}$c. per ℔.
Goat Skins—Jamaicas, 50c. to $53\frac{1}{2}$c. per ℔.
Pimento—$4\frac{1}{2}$c. to $4\frac{5}{8}$c. per ℔.
Rubber—No quotations.
Sugar—Muscovados, 89°, $3\frac{3}{16}$c. to $3\frac{1}{4}$c. ; Centrifugals, 96°, $3\frac{11}{16}$c. to $3\frac{3}{4}$c. ; Molasses, 89°, $2\frac{15}{16}$c. to 3c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—August 15, 1903.—Messrs. T. S. Garraway & Co. and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·75 per 100 ℔.
Cacao—$13·00 per 100 ℔.
Cocoa-nuts—$12·00 to $14·00 per M. (Husked nuts)
Coffee—Jamaica and ordinary Rio, $8·00 to $8·50 per 100 ℔.
Hay—New Brunswick, 80c. to 90c. per 100 ℔.
Manures—Nitrate of Soda $57·00 to $65·00 ; Ohlendorff's Dissolved Guano $60·00 ; Sulphate of Ammonia $76·00 to $85·00 ; Sulphate of Potash $67·00 per ton.
Molasses—18c. per gallon, and $4·00 for puncheon.
Onions—Madeira, $1·75 to $2·00 per 100 ℔
Potatos, English—$2 75 to $3·00 per 100 ℔.
Rice—Ballam, $4·50 per bag (188 ℔.) ; Patna $3·50 per 100 ℔. ; Rangoon, $2·75 to $2·80 per 100 ℔.
Sugar—In hogsheads, $1·35 per 100 ℔., and $5·00 for hhd. In bags, $1·60 per 100 ℔.

British Guiana,—August 13, 1903.—Messrs. Weiting & Richter.

Arrowroot—St Vincent, $9·50 per barrel.
Cacao—Native, 11c. to 12c. per ℔.
Cassava Starch—$8·50 to $9·00 per barrel.
Cocoa-nuts—$8 00 to $10·00 per M.
Coffee—Rio and Jamaica, $10\frac{1}{2}$c. to 11c per ℔. (retail).
  —Creole, 11c. to 12c. per ℔.
Dhal—$3 15 to $3·25 per bag of 168 ℔.
Eddoes—$1·56 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon, casks included.
Onions—$1\frac{1}{4}$c. to 2c. per ℔.
Pea Nuts—Curaçoa, $3\frac{3}{4}$c. ; American, 5c. per ℔. (retail).
Plantains—20c. to 40c. per bunch.
Potatos, English—$3·00 per barrel.
Rice—Ballam, $4·50 to $4·70 ex store ; Patna and Seeta, $5·60 to $5·75 per bag.
  —Creole Rice, 20c. to 22c. per gallon (retail).
Sweet Potatos—Barbados, $1·44 per barrel.
Tannias—$2·16 per bag.
Yams—$2·16 per bag.
Sugar—Dark Crystals, $1·87\frac{1}{2}$ to $1·92\frac{1}{2}$; Yellow, $2·15 to $2·25 ; Molasses, $1·70 to $1·90 per 100 ℔.
Timber—Greenheart 32c to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—August 13, 1903.—Messrs. Gordon Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Venezuelan, 41c. per ℔.
Cacao—Ordinary, $12·00 to $12·25 ; Estates, $12·75 to $13·00 per fanega.
Coffee—5c. to 6c. per ℔.
Onions—$1·75 to $2·15 per 100 ℔.
Potatos, English—$1·80 per 100 ℔.
Rice—Yellow, $4·25 to $4 40 ; White Table, $5·50 to $5·80 per bag.
Sugar—No quotations.

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A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Hurricanes and Agriculture.

WE have endeavoured, elsewhere in the present issue, to give some idea of the nature and extent of the havoc wrought upon the crops of Jamaica by the recent hurricane. It will be seen that almost everywhere damage has been done. In most districts, except in the south-west, the majority of the banana and cocoa-nut trees have been blown down, and a large proportion of fruit and other trees have been either uprooted, or, if left standing, entirely divested of their fruit and foliage.

The regret felt at Jamaica's loss is all the more keen, since, though the colony has passed through a serious crisis, it was being realized that the corner had been turned, and that during the last few years there had been a material increase in her prosperity. Quite recently, we pointed out in the *Agricultural News* (Vol. II, p. 262) that Jamaica exports had increased by nearly 25 per cent., the improvement being chiefly due to enhanced values in the banana, orange, cacao and pimento industries.

It is greatly to be hoped that, as soon as the agriculturists have, to some extent, recovered from the severe shock they have sustained, they will make every possible effort to retrieve their losses. We have read in the Jamaica papers various useful and timely suggestions, that have been put forward by those interested in the development of agriculture in that island, and desire to draw to them the attention of our readers throughout the West Indies.

To minimise, as far as possible, the want that must inevitably come about through the loss of ground provisions and such favourite food-stuffs as mangos, bread-fruits, etc., settlers are urged to lose no time in planting their grounds in some crop, that will give a large yield in the shortest possible time. For this purpose, potatos, both sweet and Irish, beans and peas are recommended. Of these, sweet potatos give a crop in from three to four months after planting, Irish potatos in a still shorter time, while certain kinds of beans will be ready for use in a comparatively few weeks. The varieties that should be planted are 'Black-eye' and 'Quick increase.' These might well be sown between the rows of banana stumps or anywhere else amongst widely planted crops. It is also pointed out that as the American corn-crop will be both late and short, advantage might be taken to plant corn; the weather since the hurricane, with almost daily showers, being most favourable for this purpose.

Reference is made elsewhere to the great damage done to cacao trees by the falling on them of the larger trees planted for shade. Now cacao is a tree that is very susceptible to fungoid diseases, and great care must be taken, by means of judicious pruning, to prevent infection. All broken boughs should be cut back beyond the rent, as near to their supporting limbs as possible, in order to give the tree the best chance of healing up its wounds. This matter of the treatment of wounds is one that receives far too little attention in the West Indies, with the result that exposed surfaces are left for the entrance of disease spores and boring insects. All cuts should be made as clean as possible, for a jagged wound takes long to heal. It is also advisable, especially in the case of so susceptible a tree as cacao, to cover over the wounds with tar.

It is to be hoped that strenuous efforts will be made to replant provision grounds and portions of estates, and that no time be lost in starting new areas with cocoa-nuts, avocado pears and bread-fruit. To mention one of these, viz: cocoa-nuts. There are very few crops which respond so readily to good cultivation. If properly planted and carefully attended to, so far as watering and manuring are concerned, crops can be reaped in five years or even earlier. But for this, special preparation must be made. The nuts should be sown in well prepared seed-beds in a shady spot, and planted out when six to eight months old in large holes, which have been filled with a mixture of top soil, manure and ashes.

We would draw special attention to a letter from Mr. H. H. Cousins, the Government Analytical and Agricultural Chemist at Jamaica, which appeared in the *Gleaner* of August 24. Writing on the subject of 'Emergency food-stuffs,' Mr. Cousins gives two tables, one indicating the flesh-forming and fuel value of common West Indian food-stuffs, and the second, the food requirements of a native labourer in pounds per diem, (1) to maintain bodily condition and (2) to satisfy working requirements. The letter proceeds: 'The tables bring out clearly the superiority of sweet potatos as a famine food over any other staple that can be grown in Jamaica. Without question it will yield, in a given time, a larger return of actual food. It is, however, very deficient in flesh-producing properties. It would require a man to eat 9 lb. of sweet potatos to obtain enough material to repair the daily waste of his tissues. On the other hand, beans and peas are very rich in flesh-forming constituents. They are the poor man's meat.'

This reference to the value of sweet potatos as food is of interest in connexion with the proposal of the Imperial Commissioner of Agriculture, mentioned in our last issue, to ship sweet potatos to Jamaica for the purpose of restocking the provision grounds. It may be stated here that a first shipment from Barbados was forwarded by the R.M.S. *Trent* on the 31st. ult. Further supplies of sweet potatos and of agricultural seeds will probably be sent by the present mail.

SUGAR INDUSTRY.

Sugar-cane Experiments at British Guiana.

The following is the conclusion of the progress report on the sugar-cane experiments in British Guiana, the first portion of which was published in the last number of the *Agricultural News* (Vol. II, p. 274):—

8. *June.* The heavy weather continued during the month, 22·57 inches of rain falling at the canefield. The canes on the northern half of the manure experiment plots on the South field were cut and weighed, samples being sent to the laboratory and analysed. A series of manure experiment plots, planted with Bourbon canes, was treated similarly. The noticeable feature among the canes reaped, both ratoons and plants, was the abnormally high proportion of the growing parts of the canes, the green tops and leaves.

Large quantities of canes were distributed to estates in Demerara and in Berbice, which had not received their full quota at the December distribution.

The heavy rainfall, although it has delayed certain desirable cultural operations being carried out, has not injured the cultivation generally. On days on which the land was too wet for advantageous tillage, the labour-gang was utilized in carrying out various necessary improvements.

[The total expenditure for the year 1902-3 was $2,616·43, the cultivation expenses amounting to $2,248·56 and the cost of manures and supplies $367·87.

The expenditure for the six months ended June 30, 1903, was as follows:—

Cultivation expenses	$1,221·79
Salaries and allowances	380·00
Supplies	23·46
Total	$1,625·25

The following shows the proportions of the expenditure borne by the local vote and by the Imperial Grant-in-Aid during the half year :—

Local Vote :—	
Cultivation expenses	$872·89
Supplies	23·46
Total	$896·35
Imperial Grant-in-Aid :—	
Cultivation expenses	$348·90
Salaries and allowances	380·00
Total	$728·90]

9. In bringing this report to a close I desire to acknowledge, and to direct attention to, the energy, zeal and attention which Mr. Ward, Agricultural Assistant in charge of sugar-cane experiments, has devoted to his work. When expressing myself to a similar effect in my progress report for the half-year ended June 30, 1902, I wrote:—'his work, in my opinion, cannot fail in the near future to render the experiments a credit not only to the Board of Agriculture but to the colony at large ;' the correctness of this opinion has since been shown by the following remarks made by the Imperial Commissioner of Agriculture for the West Indies at a meeting of the Board of Agriculture after his inspection of the fields in May :—'I have also visited, with Professor Harrison, the experiments carried on under the direction of the Board at the Botanic Gardens and elsewhere, and I desire to express my admiration at the very great progress that has taken place in these since I was here six years ago. . . . . As regards the sugar-cane experiments carried on here in which, as you are aware, the Imperial Department takes great interest and to which it contributes a share of the expenses, I am in a position to state that the character and extent of the opreations are such that, I believe, they are not surpassed by similar experiments in any part of the world.'

Sugar Convention Bill.

The following letter, addressed by Mr. C. Czarnikow, the head of the well-known firm of sugar brokers in London, on the probable effect of the Sugar Convention Bill in the West Indies, appeared in the *Spectator* of August 15 last. The information contained in Mr. Czarnikow's letter will be read with interest in these colonies:—

> A paragraph in the *Spectator*, of August 8, about the Sugar Convention Bill, contains a statement with which I agree, viz :—'We have always challenged the wisdom of interfering with the access of sugar, as of every other commodity, to these islands, and of infringing, save only for revenue purposes, the principle of the free and open market on which our commercial welfare rests.'
>
> Unfortunately, this principle has been seriously interfered with by bounties and cartels as regards sugar ; therefore your criticism of the Sugar Convention is so contrary to fact that I venture to ask for space to correct it. You state :—'The best we can hope is that the Sugar Convention will do no harm, but there seems not a little reason to fear that it will (1) make sugar dearer to consumers, (2) injure our home sugar and confectionery trades, and (3) even impair the position of certain of the West Indian islands by depriving them of the preference, they now obtain in the American market.' Statement 1. The whole of the sugar experts who deal in beet and cane sugar in Mincing Lane are of opinion that the price of sugar in the next ten years will not average higher than during the last ten years, and they surely are the best source from which to obtain authoritative information on this point. Statement 2. If then sugar is no dearer, the home sugar and confectionery trades cannot be injured by the Convention. Statement 3. The West Indies have enjoyed no preference in the American market, but they have been obtaining there the Free-trade market hitherto denied to them in Free-trade England, owing to the fact that bounty-fed sugar has had to drop its bounty into the United States Exchequer before entering the United States. The effect of the Convention is that the West Indies now get not only a Free-trade market in the United States, but a Free-trade market also in the United Kingdom, and have in addition, outside the Convention, a preference in Canada. I fail to see how the position of certain of our West Indian islands is impaired.
>
> Allow me also to refer to your leader, 'Wanted: an Industry Ruined by Free-trade,' in which a very serious mis-statement occurs, based upon a letter from 'A Sugar Merchant' in your issue of July 18, wherein he asserts that a great deal more sugar is now refined in the United Kingdom than was the case before sugar bounties came into force. Bounties became accentuated in the 'eighties', though existing in the 'sixties'; but while in 1884, 842,778 tons were refined in Great Britain, in 1897 the quantity declined to 602,000 tons, notwithstanding an increase in the consumption from 1,075,000 to 1,442,000 tons during the same period. I think these figures speak for themselves.

Sugar-cane Experiments at Barbados.

The following is taken from the Barbados *Agricultural Reporter* of September 5 last:—

In accordance with the practice of former years, it has been arranged that the results of the Sugar-cane Experiments carried on during the season 1902-3 by Professor d'Albuquerque and Mr. J. R. Bovell, under the direction of the Imperial Department of Agriculture, will be laid before the members of the planting community at a special meeting of the Barbados Agricultural Society to be held on Friday next, the 11th. instant, at 2.30 p.m. It is understood that on this occasion the Society invites the attendance of all, who are interested in sugar-cane experiments, and who may desire to be present to hear the results fully explained to them.

A summary of the address, given by Professor d'Albuquerque and Mr. Bovell, will appear in our next issue.

TOBACCO AT ST. KITT'S.

An experiment in growing tobacco was started last year at the Botanic Station, St. Kitt's. Samples of tobacco cured at the Station were forwarded to experts in England for reports. The experiments are being continued this year, and, no doubt, the experience gained will lead to the production of a good class of tobacco.

The Curator sends the following extract, in reference to the tobacco experiments, from the report of Mr. J. Steele, C.B., on 'Excise restrictions in force in the West Indies and British Guiana' issued in July 1903 :—

An experiment was made last year by Mr. Lunt, Curator of the Botanic Station in St. Kitt's, in growing tobacco in several places on different farms. There can, I think, be no doubt that a large area of this island is well fitted for tobacco cultivation, and with an intelligent, thoughtful and resourceful man like the Curator, I have every hope that the experiment will prove a success. Havana and Sumatra are the plants with which the experiment has been made. The leaf grown has a good appearance, and when the drying, curing and fermenting operations are perfected, the industry of tobacco growing should be profitable.

WEST INDIAN FRUIT.

SHIPPING BANANAS FROM BARBADOS.

The following is taken from the *Barbados Advocate* of September 5, last:—

By several of the fortnightly mail steamers, shipments of locally grown bananas have been made to England and the fruit fetched good prices. But the last shipment, which arrived there, was not in good condition, and this fact pointed to the need of remedy in some direction. As a means of effecting this, a meeting of planters and others interested in the growing and shipping of bananas was convened at the Planter's Hall yesterday afternoon for the purpose of conferring with the Imperial Department of Agriculture in the matter. The meeting was numerously attended, Sir Daniel Morris, K.C.M.G., the Imperial Commissioner of Agriculture, being present. The Hon'ble Forster M. Alleyne was voted to the Chair. After the subject was fully discussed, the meeting, on the initiative of the Commissioner of Agriculture, adopted four resolutions. Briefly put, these resolutions authorise Mr. J. R. Bovell, the Agricultural Superintendent of the Department, who has been looking after the shipment of the fruit and has not spared himself in carrying out this work, to continue, as heretofore, to reject bananas which arrive at the shipping depôt not up to mark or not properly packed. Mr. Bovell is also to guarantee that bananas are delivered on board the steamer in a fit condition. The Royal Mail Steam Packet Company is to be requested to guarantee a daily record, during the voyage, of the temperature of the room in which the fruit is stored. Capt. W. H. Owen, the Superintendent of the Company, who was at the meeting, promised this guarantee. The last mail steamer (29th. ult.) carried 678 bunches of bananas from this port, and the shipment the previous fortnight was only one or two bunches less than this number. The area of land under banana cultivation is extending, and it is estimated that at this time next year the shipment by every mail steamer will be about 3,000 bunches.

THE CULTIVATION OF MANGOS.

Indian Planting and Gardening, of July 18, has an article on the cultivation of the mango in India, from which we take the following extracts relating to methods of propagation:—

The cultivation of the mango in India is not conducted upon any recognized plan. There are a few ardent amateurs, who devote some attention to what I may describe as 'cultivation.' For the rest, even in large private and public gardens, the mango trees are left very much to themselves. The result of this is that trees that would, if cared for, produce good fruit, yield only fruit of indifferent quality. The mango is propagated by several methods:—

(1) *By seed.* This is, of course, Nature's method of reproducing species. In the case of the mango, however, it is the general belief that seedlings rarely produce fruit equal to that of their parents. My own experience has been varied. I have found plants raised from seed of grafted mangos produce fruit equal to that of the parents, provided they received good treatment. Plants raised from Beejoo (seedling) mangos invariably produce inferior fruit to that of the parent. Why this should be so, I am unable to give a satisfactory answer. But the fact remains. My advice, therefore, is to raise plants from seeds of grafted mangos, if it is desired to have good, healthy trees, and time is no object. The seed of the mango should be sown *immediately* after the fruit is eaten, as it does not retain its vitality long.

(2) *By grafting or inarching.* This is the universal method of propagating the mango in India for garden purposes. This method has three advantages over propagation by seed. Firstly, the graft comes into fruit much earlier, that is, in three years from time of planting out; secondly, the trees are dwarfed in growth, rarely attaining a greater height than 12 feet, and therefore much better suited to an average Indian garden; and thirdly, the fruit *always* comes true to its parentage. These points being taken into consideration, it will readily be understood why it is the favourite method. The stock, not more than one year old, should be in pots, and the scion should be of the same thickness as the stock. This point is most essential for success, because the junction of the two branches takes place by means of the cambium layer between the bark and the wood. A fundamental principle, which applies to every method of grafting, is the necessity of forming a direct communication between the cambium layers in each of the parts to be united. To ensure success with the graft, I advise the use of plantain fibre for tying the two stems, and that the whole be coated over with a simple grafting wax or grafting clay. Grafting clay is prepared by mixing two parts of clay and one part of cowdung. But the method of inarching, or approach-grafting, resorted to here in the case of the mango, is effective without any wax or clay, provided the junction has been properly effected.

(3) *By budding.* This method has come into notice quite recently. I have not tried it myself, because the accounts I have read of the trials made by others, did not give hope of much success. The percentage of successes was small in every case. I do not recommend this method for general adoption. The operation of budding is simple enough, and it may be tried with the mango as an experiment.

COTTON.

Cotton Industry in the West Indies.

The prospects of the cotton industry in the West Indies are of so hopeful a character that every effort is being made by the Imperial Department of Agriculture to assist those embarking in it. Thanks to the active co-operation of the British Cotton Growing Association, it is estimated that about 30,000 ℔. of cotton seed has been distributed either free, or at a nominal cost, during the present season, and the officers of the Department have been strenuous in assisting and advising those who are embarking in the industry.

Another important feature bearing upon the subject is the erection, by the aid of the Department, of central cotton factories at Barbados, Antigua, and St. Vincent, while a fourth is proposed to be erected by private enterprise at Nevis.

While it is clearly understood that the present prices are exceptionally high and cannot be maintained, there are well-grounded hopes that, where suitable land is selected and the cultivation is carefully and economically carried on, the results cannot fail to be satisfactory.

With the view of placing at the disposal of the planting community recent and reliable information as regards the methods adopted for growing and dealing with cotton—and especially Sea Island cotton—in the United States of America, the Secretary of State has approved of the proposal that the Imperial Commissioner of Agriculture should visit certain of the Southern States during this autumn, in order to make a thorough study of the industry and publish information specially adapted to the circumstances of the West Indies.

The number of the *West Indian Bulletin*, now in the press (Vol. IV., No. 3) will be entirely devoted to the cotton industry. It will deal with Sea Island cotton and its varieties and the treatment of the crop.

It is probable that Sir Daniel Morris will embark for New York in S.S. *Tennyson* on September 14, and will return at the end of October or early in November next.

Cotton at Tobago.

In connexion with the efforts at present being made to establish a cotton industry in the West Indies, the following extracts from Chief Justice Woodcock's *History of Tobago*, 1862, kindly forwarded by Mr. C. L. Plagemann, will be of interest. Many of the remarks on this subject are equally applicable to present conditions:—

We are told in the *Encyclopaedia Britannica*, 1854 edition, under the title of 'Cotton manufacture,' that in the year 1792, Mr. Jonathan Pollard of Manchester succeeded in spinning yarn upon the mule of 278 hanks to the ℔. from cotton-wool grown by Mr. Robley, in the island of Tobago. This yarn was sold at 20 guineas per ℔. to the muslin manufacturers at Glasgow. This cotton was of the finest quality ever brought to England. Mr. Robley carried on the cultivation of this article to some extent, but the price of cotton falling very low, and the cultivation of sugar becoming extremely profitable, he was induced to convert his cotton grounds into a sugar plantation. The production of cotton of this very fine description has hardly ever been attempted by any other person, although it is believed that the price it would yield would amply repay its expense. Certainly there can be no place in the West Indies better suited to the production of cotton than the extensive plain on the south-west of Tobago called Sandy Point.

DEPARTMENT REPORTS.

ST. LUCIA: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL, EXPERIMENT STATION AND CACAO AND COTTON PLOTS, 1902-3.

Botanic Station: Mr. Moore's report deals with the working of the station during the year ended March 31. The year was unmarked by any event of importance. There was a considerable increase in the number of economic and other plants distributed ; this was due, in part, to the large number of lime plants supplied. The expenditure for the year was £701 3*s.* 11*d.*, the receipts from sale of plants, etc., amounting to £49 8*s.* 6*d.*

Agricultural School: The report deals with the progress of this institution, which was founded in October 1901 and maintained entirely from Imperial funds administered by the Imperial Department of Agriculture. The expenditure, including agricultural scholarships, amounted to £713 4*s.* 0*d.* Amongst the new works undertaken during the year may be mentioned the erection of a potting shed, a glass-roofed, seed-raising shed, a poultry house and a cow-pen. One very satisfactory feature of the report is the reference to the cultivation of vegetables at the School. It is observed that 'the provision grounds, started only seventeen months ago, have already been able to supply all the vegetables required for the use of the pupils during the year.' It is proposed to conduct all further work of an experimental nature at the School instead of at the Botanic Station, on account of the greater space available for the purpose. In reviewing the report, the Imperial Commissioner of Agriculture writes: 'Mr. Moore is earnestly endeavouring to carry out the work of this institution on sound and practical lines, and I am glad of the opportunity to express my appreciation of his services.'

Cacao and Cotton Experiments: Mr. Hudson gives an account of the work at the different experiment plots. At the Rivière Dorée Station, experiments are being carried out with different varieties of cotton. The instructor states that this cultivation is becoming very popular with the peasants. Considerable success is being attained at the cacao experiment plots, which are beginning to exert a beneficial influence upon neighbouring properties.

Agricultural Education: As appendices are published accounts of the efforts that have been made in St. Lucia in connexion with the starting of school gardens and the instruction of teachers in agriculture. Reports are published by Mr. F. E. Bundy, Inspector of Schools, Mr. Moore and Mr. Hudson. A very successful course of lectures was given at the Agricultural School from the 6th. to the 18th. of July last.

ONION CULTIVATION.

In the last number of the *Agricultural News* (p. 280), hints were given as to sowing onion seed and the treatment likely to give the best results under the conditions existing in the West Indies.

It is assumed that the seed for the most part has been planted, or is in course of being planted, in nursery beds, conveniently at hand, to allow of their being regularly watered, where necessary, and kept under close observation.

The essential point is that the soil should be well pulverized and that a keen look-out be kept for ants in case they may prove troublesome. A very light spraying of the soil with kerosene emulsion before, or immediately after, the seed is sown will drive the ants away. Later, a similar treatment would be useful to keep the young seedlings free from fly and thrips. Great care must, however, be exercised that the emulsion, while strong enough to check insect attacks, is not so strong as to injure the onion seedlings. The officers at the Botanic Stations may be usefully consulted in this matter.

In the present article it is proposed to add a few words as to transplanting the young onion plants, that is, transferring them from the seed beds to their permanent places in the field. On sugar estates in Antigua the onions are planted on the banks between the young sugar-canes. The land is carefully forked and broken up and kept clean of weeds; when this is done, no difficulty is experienced in planting 10 to 20 acres and in reaping, in favourable seasons, large crops of excellent onions. At Montserrat and Barbados, the more common practice is to devote a separate piece of land to onion growing and keep the plants entirely to themselves. The cost of the cultivation is thereby slightly increased; but the results may be equally satisfactory, provided the cultivators devote special attention to the plants in all stages of their growth.

In a recent little work published in the United States*, useful information is given in regard to onion growing for profit, and it is proposed to quote some of the hints, and reproduce some of the illustrations, on the subject of transplanting onions; that is, how to take them from the beds and to set them in the open ground.

In the States it is recommended, in order to obtain early crops, to sow the seeds in boxes, under glass. This is not necessary in the West Indies although, as stated on p. 280, there would be a distinct advantage in protecting the seed beds from heavy rains by means of a cheap, thin cloth placed on frames about 4 or 5 feet above the surface of the beds.

TRANSPLANTING SEEDLINGS.

Quoting from the little work above referred to, it is stated, that 'transplanting seedlings, like seed-sowing, is always most easily and most conveniently done, when the ground is freshly prepared. We can then set nearly, or fully, twice as many plants in the same length of time as a few days later, after the ground has again become hard or backed down by rain.'

Mr. Greiner continues: 'If the ground is freshly prepared, and as loose and mellow as we should expect it under the circumstances, *I prefer to set the plants with the finger alone, and without the use of a dibber.* It is a simple and quick operation, too, and for myself, I could, if I wanted to keep at it, easily set 6,000 plants in ten working hours. I take hold of the plant with the left hand, place it with the root end just a trifle to the right of the place where I wish to have it planted, and then with the thumb or index finger of the right hand press the bulb, or lower end of the plant, down into the soft earth until it stands just where I want it. This is the work of a very few seconds, and all I have to do afterwards is to run the fingers over the ground near the plant to fill up the hole left by manipulation, smoothing the surface.

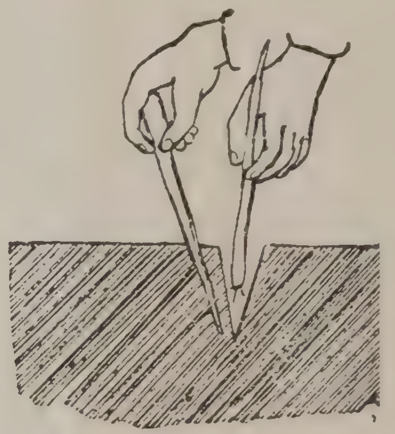

Fig. 23. Setting the Plants with Dibber.

My plan is to have a patch planted as quickly as possible after the ground has been put in shape, and it will usually pay well to get extra help to do it, rather than prolong the work by keeping only a small force at it. If, by any chance, we have to cease and let the soil become hard and packed, I always try to get it into condition again by harrowing and marking, before going on with the setting.

If plants have to be set into hard soil, a small dibber will be needed. This may be made of a piece of seasoned hardwood, 6 inches long, and 1 inch in diameter at the large end, tapering to a point at the other. The operation of setting the plants with the dibber is made so plain by the accompanying illustration (fig. 23) that little explanation by words will be needed. Open the hole with the dibber and insert the plant an inch or so deep. Then strike the dibber into the ground an inch or so behind the plant, and, using the lower end as a pivotal point, draw the upper end toward you, thus pressing the soil firmly against the underground part of the little plant. This, of course, leaves another little opening just behind the plant. This may be closed, and the surface somewhat smoothed, by another light stab with the dibber, or a simple manipulation of the fingers.

A broken kitchen knife ground to a point or a little flat steel dibber with handle such as may be made by any blacksmith at small cost, will always do good service. In opening the hole have the flat side of the knife or dibber facing you. Then insert the plant behind the dibber, withdraw the latter and strike in again at the back of the plant, pressing the soil against the roots in the same manner as was done with the wooden dibber.

A good way of managing the whole operation is as follows: Take up a lot of plants from the seed bed, which may be done by running the point of a small trowel under them, and lifting them out. Carefully separate and straighten them out. Next trim off a part of the tops, if long and slender, and the ends of the roots, as shown in fig. 24. The work of setting out the plants is more conveniently done, and will proceed much faster, when the plants are short and stiff, than when they are left encumbered with an excess of flimsy growth at each end. Besides, the untrimmed plants are liable to bend or fall over, and be in the way; while the trimmed plants stand up straight and stiff from the very start. Briefly, I believe in shortening the plants at both ends very thoroughly. It will do no harm, and may do some good to trim the roots away to within almost half an inch of the bulb or stem. With long roots left on, some of the work-people are bound to set the plants in the manner shown in fig. 25, while the plants with short roots are more likely to be properly planted, as shown in fig. 26. The new roots start out directly from the end of the stem, and the plants with closely trimmed roots will usually take hold of the ground more promptly than those with all the roots left on.

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* *THE NEW ONION CULTURE:* A complete guide in growing onions for profit. By T. Greiner: New York, Orange Judd Company, 1903.

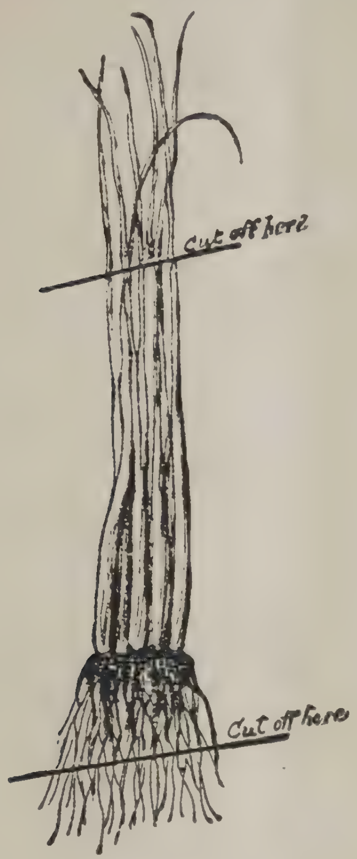

Fig. 24. Trimming the plant.

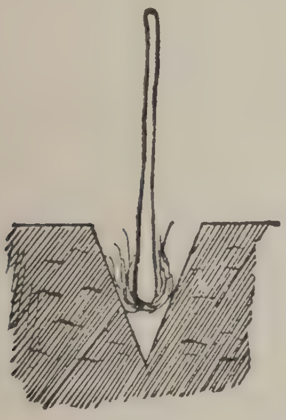

Fig. 25. The wrong way.

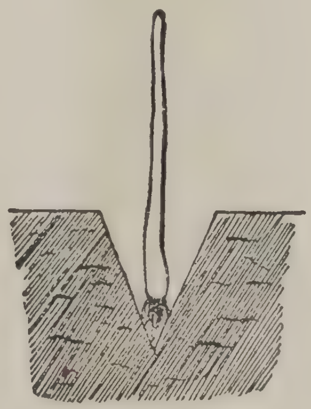

Fig. 26. The right way.

When the plants are thus prepared for setting and bunched off, let a boy take a basket full of them and drop them in bunches just ahead of the planters. Of course, the work should be begun just as soon as the ground can be got into proper condition. The soil must be moist and crumbly, but not wet or sticky. Begin with the plants that were started first, or are largest, and carry the job to completion, as speedily as possible.

The question is often asked: How deep should onion plants be set? An onion plant will live and make a bulb whether you set it ½ inch or 3 inches deep. But we want the bulb to grow pretty well out of the ground. This seems to be the nature of the onion plant. In order to show this in a theoretical way, I have drawn the illustrations which picture the objects in reduced size. Fig. 27 shows the plant set 1 inch deep, the roots reaching further down, and before long probably finding their way clear down to the sub-soil. The bulb will spread out to fullsize as indicated by the dotted line. This brings it just where we want it, namely, two-thirds or more above the surface of the ground, where it can be easily worked and harvested. In fig. 28, the plant is shown as being set 1½ inches deep. If planted in a dry time and in dry soil, the roots may find more moisture and the plant revive more quickly after the transfer, but the bulb is rather too far down in the ground. Altogether I believe that 1 inch is just about the right depth.

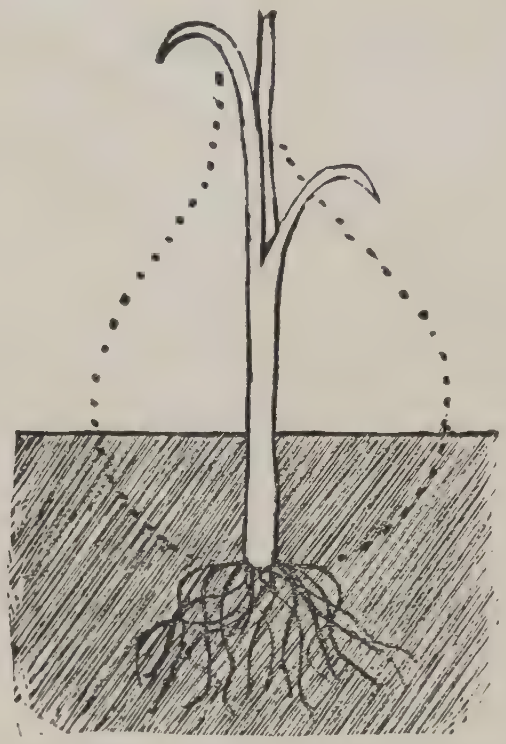

Fig. 27. Plant set right depth.

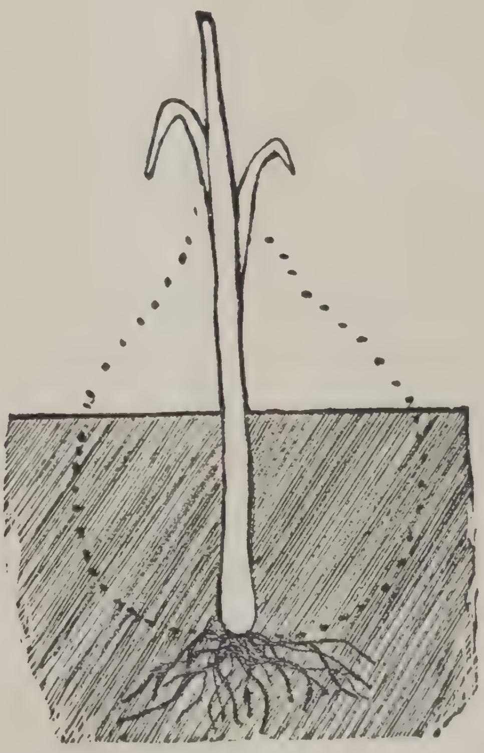

Fig. 28. Plant set too deep.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 287 of this volume.

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Agricultural News

Vol. II. SATURDAY, SEPTEMBER 12, 1903. No. 37.

NOTES AND COMMENTS.

Indian Goats for the West Indies.

The Imperial Commissioner of Agriculture has written to Mr A. C. Stewart, Immigration Agent at Calcutta, asking for information as to the best breed of goats to be met with in the tropical parts of India. Mr. Stewart has been requested to ship a couple of young male goats to Barbados, if satisfied that they are superior to those now in the West Indies.

Some of the goats at Barbados were, it is believed, originally obtained from a Coolie ship that was wrecked on the coast of Barbados many years ago. The Indian goats are remarkable for their size and very long, pendant ears. They also possess good milking qualities and are in great demand everywhere.

Uses of the Banana.

On page 302 of the present number, Mr. J. R. Jackson, in concluding his article on the drug and spice productions of the West Indies, refers to the uses of the banana. 'Quite recently,' he says, 'a new food for infants, invalids and the aged has been placed before the public under the name of "Banannia" which is said to be manufactured in Cuba from the freshly gathered fruit, no other ingredient of any kind being added. Another food of a similar nature, known as "Banana Malted Food" is said to be prepared from the finest Jamaica bananas combined with malt.' Both articles are now being placed on the market as ideal foods for invalids.

Oil Plants.

Among the cultivated plants of the West Indies are a number from which useful oils can be obtained. The most important examples are the cocoa-nut, the ground nut, the castor-oil plant and cotton. It now appears that there is a probability of another plant being added to this list. According to the *Agricultural Bulletin of the Straits and Federated Malay States*, the Scientific and Technical Branch of the Imperial Institute are investigating the properties of the seeds of the Para rubber tree. It is thought that the oil obtained from them is likely to be of considerable commercial value. If planters are enabled to obtain a fair price for these seeds, a certain impetus is likely to be given to the planting of Para rubber in the West Indies.

Grass and Hay.

The Agricultural World, of August 15, discusses the question of the amount of grass required to make a ton of hay. It is pointed out that the amount will, naturally, depend very much upon the character of the grass, the care with which it is dried and a number of other conditions. On an average green grass loses 60 per cent. of its weight in the hay-making process, so that it requires nearly 3 tons of grass to make 1 ton of hay. Experiments, conducted last season by the Agricultural Department of the University College at Reading, show that this proportion is largely influenced by the nature of the grasses, and especially by the manurial treatment received by them.

In the *West Indian Bulletin*, Vol. III, p. 353, analyses are given of various West Indian fodders by the Hon'ble F. Watts. From these notes it will be found that Guinea grass loses 71 per cent. of its weight on drying, Para grass 70 per cent., while Hay grass and Barbados sour grass lose 60 per cent. of their weight. Upon that estimation it would take 3½ tons of Guinea grass, 3⅓ tons of Para grass and 2½ tons of Hay grass and Barbados sour grass to yield 1 ton of hay in each case.

The 'Botanisches Centralblatt.'

This publication is the organ of the International Association of Botanists, an association which possesses numerous members in all parts of the civilized world. The president of the association is Dr. K. Goebel, Professor in the University of Munich, the vice-president is Dr. F. O. Bower, Professor of Botany in the University of Glasgow.

The *Botanisches Centralblatt* has, in each country, a number of special editors, each of whom studies all the botanical papers published that relate to his part of the subject, and prepares a short note on each for publication in the *Centralblatt*, which appears every week.

We notice that Mr. W. G. Freeman, late Scientific Assistant on the staff of the Imperial Department of Agriculture, and now Superintendent of the Economic Collection at the Imperial Institute, has been appointed special editor in economic botany for Great Britain and the colonies. His duties are to review, briefly, as completely as possible, the papers on economic botany appearing in Great Britain and the colonies.

Production of Coffee in India.

A report has recently been issued by the Government of India regarding the production of coffee. It is stated that 219,293 acres of land were under coffee at the end of 1902. The cultivation of coffee is practically confined to the elevated region above the south-western coast. There were 28,148 persons permanently, and 62,515 temporarily, employed on the coffee estates in 1902. The average price obtained for East Indian coffee in London in 1902 was £3 per cwt., an increase of 13*s.* on the price obtained during 1900 and 1901. There is no local demand for coffee.

Cacao in Trinidad.

In the *Gardeners' Chronicle* of August 16, there is an article on cacao by Mr. J. R. Jackson, the writer of the notes on the London drug and spice market, that appear from time to time in the *Agricultural News*. The article deals with the cultivation of cacao in the West Indies and gives figures showing the extent to which it is cultivated in the various islands. Illustrations are given depicting the fruit with a portion removed to show the seeds and a stem of cacao with fruits and flowers.

To this note is added a comment by Mr. J. H. Hart, Superintendent of the Botanic Gardens, Trinidad, in which a description is given of two scenes represented in a supplementary illustration. These are two views of the Maracas River upon the banks of which are extensive cacao cultivations.

Cacao Culture at the Gold Coast.

We take the following account of the development of the cacao industry as a native cultivation from the *West African Mail* of May 22, 1903:—

The first cacao plants were introduced in 1879 from Fernando Po, and the first harvest (of 121 ℔.) reaped in 1885. The regular export of cacao began in 1891. From that year, the Government has manifested a keen interest in the native cultivations. The Botanic Station at Aburi began cultural investigations with cacao, and information was given to the native chiefs as to the position of cacao on the home market. The Curator of the Botanic Gardens has visited the interior in order to instruct the natives in cacao cultivation. Thousands of young plants have been distributed among the natives. The Government has now begun to take in hand the shipping of the harvest. Diseases, with the exception of a borer that has lately appeared, are unknown. The prospects of the industry are thus very promising. The facilities for transport are, however, insufficient; the crop being still carried down to the coast on the head, or rolled in barrels. The preparation of the cacao is also very imperfect, and consequently, the product fetches a price of only 48 to 49 pf. (about ½*d.*) per ℔. The development of the industry is shown by the following figures:—In 1891 the export was 80 ℔., valued at £4; in 1895, this had increased to 28,906 ℔., valued at £470; while in 1902 it had reached 5,367,405 ℔., valued at £94,944.

The Culture of the Ground Nut in Senegal.

A note in *Der Tropenpflanzer* for August 1903, gives an account of this culture, taken from an article by M. Ed. Payen in the *Economiste Français* of June 6, 1903.

The ground nut is the most important economic product of Senegal (French East Africa), which, with India and the United States, practically supplies the world.

In Senegal the ground nut is planted in July and reaped from November to February. The yield, on good soil, averages 1,500 to 1,800 kilograms per hectare (11½ to 13 cwt. per acre).

The ground nuts were first imported to France to be used in the manufacture of 'economical' chocolate. It was not until after 1840 that they were used as a source of oil. From this time the exports from Senegal to France increased enormously. In 1840 the export was only 1,200 kilograms (about 24 cwt.), while in 1850 it was 2,600,000 kilograms (over 50,000 cwt.). The export continued to increase until 1882, when it reached 83,000,000 kilograms.

In 1883 the exports began to decrease owing to the competition of India; in 1886 they fell to 26,500,000 kilograms. From 1886 to 1901, the output of Senegal ground nuts has increased five fold, owing to the opening up of the country by the railway. Nearly three-fourths of the export from Senegal go to France.

The nuts are first cleaned, shelled, and winnowed to separate the husks from the kernels. The nuts are subjected to three successive pressings, the first two in the cold, the third when warm. The best oil is obtained at the first pressing.

The oil content varies with the origin and quality of the crop. The Senegal nuts, unshelled, yield 32 per cent., of which 21 per cent. is expressed at the first, 6 per cent. at the second, and 5 per cent. at the third crushing. The cake still contains 5 per cent. of oil, which cannot be extracted by mechanical means.

The ground nut oil contains more margarine than olive oil; its illuminating power is about the same.

The oil from the first pressing is mixed with olive oil in the proportion of 50 to 75 per cent., and the mixture is still palatable. It is also much used in the manufacture of margarine, which may contain 20 to 30 per cent. The oil, especially that extracted at the third pressing, is largely used in soap-making.

The cake, which contains 40 to 50 per cent. of nitrogenous matter, forms a valuable food for animals; it is used, however, to a larger extent as a manure for meadows and vineyards. In 1901, Marseilles sold oil cake to the value of 9,380,000 francs (about £390,000).

The ground nut is used in Europe, especially in Spain, for the adulteration of chocolate. For this, 20 per cent. of oil is expressed, and the residue is mixed with the cacao paste.

An account of the ground nut industry of Barbados has already appeared in the *Agricultural News* (Vol. I, p. 136); and, in the recent issue of the *West Indian Bulletin* (Vol. IV, p. 101), a detailed account is given of the culture of the ground nut in the West Indies, and its possibilities.

INSECT NOTES.

The Mole Cricket.

The 'changa' or mole cricket has already been referred to in the *Agricultural News* and the *West Indian Bulletin*. In this note we propose to call attention to the information already given in the publications of the Department and also to an illustration of the insect, which originally appeared in *Bulletin No. 2* of the Porto Rico Agricultural Experiment Station, dealing with the appearance of the pest in that island.

In the *West Indian Bulletin*, Vol. II, p. 349, there appeared a note entitled 'Destruction of Mole Crickets.' The insect is mentioned as a serious enemy to young plants, lawns and grass plots in St. Vincent and St. Lucia, and as occurring in Dominica and Trinidad. This note also refers to an article by Mr. H. Maxwell-Lefroy in the *St. Lucia Gazette* of October 11, 1901, calling attention to the soap and water method of control on lawns. It is also suggested that boards be placed edgewise in the soil around seed beds, with small tins containing water, sunk into the ground, as traps. The insects fall into these tins and are drowned.

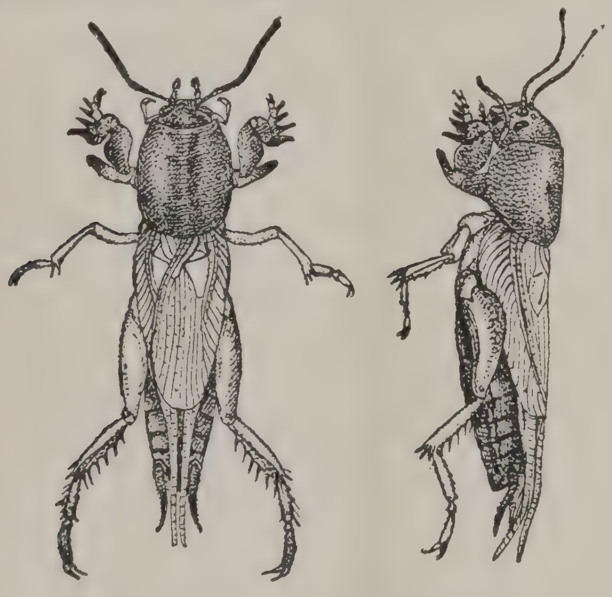

Fig. 29. THE MOLE CRICKET.

Adult from above at left, from side at right.

In the *Agricultural News*, Vol. I, p. 40, it is stated that the local name in St. Lucia is 'Cochin terre,' and that serious damage is done by the pest in that island to tomatos, roses and oranges.

In the *Agricultural News*, Vol. II, p. 104, will be found a summary of *Bulletin No. 2* of the Porto Rico Agricultural Experiment Station of the United States Department of Agriculture, in which are briefly given the description, habits and enemies of this pest, the amount of damage annually caused by it in Porto Rico, as well as the various methods that have been adopted for dealing with it.

The occurrence of the mole cricket at one point in St. Kitt's is recorded in the extracts from the report of the Entomologist of this Department on the economic entomology of St. Kitt's-Nevis, published on page 200 of this volume, where reference is made to the plan, adopted by Mr. Dobridge, of sinking in the ground small tins containing water. A good idea of the appearance of the adult insect will be obtained from the accompanying cut (fig. 29). The younger forms differ chiefly in having shorter wings, which first appear as small pads on the back just behind the large thoracic shield or carapace.

The Sunflower as a Trap for the Fiddler Beetle.

Reference has several times been made in the *Agricultural News* (Vol. I, p. 100, Vol. II, p. 244) to the ravages of the Fiddler beetle *(Praepodes vittatus)* in Jamaica. Writing in the *Journal of the Jamaica Agricultural Society* for August, Dr. James Neish suggests a very ingenious use of the sunflower as a trap for this pest, which has been causing so much anxiety to orange growers:—

A most interesting observation, which I have been able to make, is that the sunflower possesses an unexpected attraction to the fiddler beetle, the larva of which is chargeable with much damage to orange trees. For the past four years, I have been making unceasing war on this enemy, searching for it with success under heaps of decaying vegetable matter, which prove very successful as traps I have also practised the catching of the winged insect. On the sunflower head I have caught as many as five of these pests. It seems to be the nectar which allures them, though primarily it is, doubtless, the showy flower which is attractive.

It is suggested that sunflowers be planted as a catch crop through a young orange grove, and by keeping sunflowers constantly growing in the vicinity of established groves, the fiddler beetle could be caught in numbers and destroyed. It should be noted, however, that the sunflower must be planted so as to be in bloom when the beetles are flying, that is, March to June. With such a catch crop the orange grower is able to set a trap for insect enemies, provide food for bees and secure the seed as food for fowls, while the stalks are readily eaten by horses and cows.

USES OF THE POTATO IN GERMANY.

The American Consul-General in Berlin has recently given some interesting facts referring to the cultivation and economic uses of the potato in Germany. We take the following extracts from *Nature* of July 30:—

In 1901, for every 10,000 inhabitants, 160 acres were planted with potatos, against 98 acres in France, 31 in Great Britain and Ireland, and 34·8 in the United States. The sandy plains of northern and central Germany are well adapted by nature to the cultivation, and elaborate experiments in scientific fertilizing and cultivation have increased the production per acre by about 38 per cent. in the last ten years. The result has been that the crop reached the danger point of over-production in 1901, and accordingly there was in that year an enormous increase in potato alcohol, and the market was glutted with raw spirit. Besides alcohol, the technical products of the potato are starch, starch syrup, potato flour, dextrin, and starch sugar. The production of these, during the last ten years, has increased rapidly, as has the export also. Last year the exports of potato flour and starch reached 45,970 tons or more than double those of 1900, while the export of dextrin was 14,047 tons. The United Kingdom is the largest purchaser of German potato starch, the imports last year being 23,827 tons.

THE HURRICANE AT JAMAICA.

From Jamaica reports and papers we have been able to obtain some idea of the extent of the damage sustained by agriculturists as a result of the hurricane, which struck the island on August 11 last. It would appear that the destruction is not confined to any particular district, but is practically universal throughout the whole island. The only parishes which seem to have escaped in any measure are Westmoreland, Manchester and St. Elizabeth, the damage done in the last named parish being comparatively slight, while no mention is made of Manchester as suffering loss.

Probably the greatest amount of damage has been done in the banana parishes of Portland, St. Mary and St. Thomas. It was in the last named parish that the cyclone first touched Jamaica, with the result that large properties—many of them belonging to the United Fruit Company—have been devastated. Again, at the other end of the island, in the parishes of Trelawny and St. James, reports state that great damage has been done.

The most important exports from Jamaica are bananas, coffee, oranges, pimento, cocoa-nuts and cacao. The extent of the trade in these products will be seen from the following figures, which show the value of the exports in each during the year ended March 31, 1903:—

Bananas, £1,134,000; coffee, £130,000; oranges, £101,000; pimento, £91,000; cocoa-nuts, £67,000; and cacao, £65,000.

The crops that have suffered most damage are bananas, cocoa-nuts and pimento. The injury is much more serious in the case of cocoa-nuts and pimento, which are in most cases permanently destroyed; while the bananas, where not entirely uprooted, will simply receive a set-back for about a year. The reports from the various districts show how general is the destruction. The constantly recurring expression—'for miles round not a banana can be seen standing'—comes from practically every parish in the island. In the case of pimento, not only have a large proportion of the trees been entirely uprooted, but the exceptionally heavy crop, which had not yet been reaped, has now been lost. The loss from the destruction of this crop was greatest in the parish of St. Ann.

Wherever orange trees were exposed to the force of the hurricane, the fruits, mature and immature, were torn from the trees. It is fortunate for the orange trade of the island that Manchester, where most of the orange groves are situated, has sustained little or no damage.

Similarly, on the coffee estates, ripe and unripe berries were found covering the ground under the trees. This has also been the fate of the bread-fruit, mango, pear and other fruit trees, which have been divested of fruit and leaves. The provision grounds of the peasants have naturally suffered very extensively. In many cases their yam plants were carried away with tubers attached, and it is reported that this crop, which is the poor man's stand-by, has entirely collapsed. In the case of ground provisions, the plants have been so battered by falling trees, that little hope is entertained of any crop being reaped.

The loss of valuable timber trees, including logwood, will also prove to be considerable.

With regard to the Botanical Gardens, we have received no reports of damage at Hope or Cinchona, but the *Gleaner*, of August 24, says:— 'The Castleton Gardens, so much frequented by tourists of late, now present a scene of sad confusion and destruction.'

The following extracts from the report to the Government of Mr. John D'Aeth, the Acting Director of Public Works, who visited St. Mary, one of the most severely stricken of the parishes, to ascertain the extent of the destruction done, will be of interest, as serving to give an idea of the nature of the damage sustained:—

Banana Industry: Not one mature banana plant is standing along the road side from Richmond to Port Maria. Fortunately, however, very few of the plants are uprooted, so that very little planting will become necessary; the broken down plants will grow again if cut off, and in one or two places, this has already been done.

Cacao Cultivation: There is a fair amount of cacao in the district, although it is by no means a prominent feature in the vicinity of the road, and it has suffered a great deal. The older and larger trees have unfortunately suffered most. They have been overthrown, or have had their roots disturbed, and I am informed that this will probably mean that they are destroyed. The smaller ones have for the most part stood, but these as well as all others, have been severely battered, and it is fairly certain that no crops will be looked for in October, the trees not having strength enough left to bring forth a crop at so early a date. I am told that, in the case of some of the large cultivations, the destruction done is to a great extent due to the overthrowing or breaking away of the big trees—guango or others—planted for shade purposes.

Cocoa-nut Plantations: Near the coast the damage has been considerable, and at Wentworth, the large, flourishing plantation belonging to the United Fruit Company, it is estimated that two-thirds of the trees are down. Probably the estimate that 90 per cent. of the cocoa-nut trees in the island have been destroyed is not a great exaggeration.

Fruit Trees: Many of the bread-fruit and avocado pear trees have been torn up: those that remain standing have all the ripe or nearly mature fruit torn off.

IMPORTED STOCK AT ST. LUCIA.

In reference to the stock imported into St. Lucia through the Imperial Department of Agriculture, Mr. G. S. Hudson, the Agricultural Instructor, reports as follows:—

On August 3, I took the Hereford bull down to Soufrière and saw him properly lodged on Mr. Kennaway's estate, and made arrangements for his food and exercise. He is a fine animal, and in good condition. He is to serve once a week for the next three months at a fee of 3*s*., and applications for service have already commenced to arrive. The Berkshire boar is not getting many services at Dennery and I shall endeavour to move him round the island. I am arranging with Mr. Moore for one of the Union ram sheep to go to Choiseul. The other districts are also anxious to have the Hereford bull. I should like to increase our stud by the addition of a jack, a ram goat, and, if possible, a stallion, which might be kept moving through the different districts. It would also be of great service if one or two high class Italian queen bees were imported for breeding purposes, and placed with reliable apiarists.

A Whip made of Bullet Tree Gutta.

Mr. William Smith, Acting Agricultural Instructor, Grenada, writes:—

While travelling through one of the villages of the interior a few weeks ago, I came across a whip made from the gutta of the Bullet wood tree. The maker, a woodcutter, told me that after bleeding the tree, he boiled down the milk to a thick mass, which he poured, while still hot, into a mould made from a length of small bamboo. The whip was very tough, and stiff enough for all practical purposes.

GLEANINGS.

According to the Trinidad *Mirror* of August 27, a cotton gin has been ordered by the government for the purpose of fostering the cotton industry in the Tunapuna district. The gin will be erected on the St. Augustin estate.

From the Report on the trade of Porto Rico for 1902, by the British Consul, it appears that, during the year 1901, cattle were exported to the British West India islands to the value of £10,500. During 1902 the value of exports under this head was £9,800.

There appears to be a considerable demand for cocoanuts at Barbados. On July 4, they were bringing $10·00 to $11·00 per thousand for husked nuts; while according to Messrs. T. S. Garraway & Co.'s market review of August 29, the price has advanced to $15·00 per thousand.

The Curator of the Botanic Station, Dominica, writes: 'I beg to acknowledge the receipt of two wardian cases of India rubber plants *(Funtumia elastica* and *Landolphia owariensis)* in first rate order from Kew. As directed, plants from the cases will be sent to St. Lucia, St. Vincent and Grenada.'

The Curator of the Botanic Station, Grenada, writes: 'The Agricultural Society's Suffolk stallion "Sir Cuthbert" is to stand for service. Fees—peasants, 10*s.*; members of Agricultural Society, £1; non-members, £2. A Spanish Ass has just been imported from England, for breeding purposes, by the Rev. G. W. Branch.'

There was a new feature at the St. Mary Agricultural Show recently held at Port Maria, Jamaica, in the form of forking and trenching competitions. This is an excellent move. In the former, we learn from the report of the judges, there were eighteen entries. A six-foot length of bamboo was placed before each man, who was instructed to keep as straight down from it as possible. The points considered in judging were depth, the fineness of the soil, the straightness of the line and the amount done.

According to the United States Consul at Para, it is believed that an exceptionally good crop of rubber will be harvested in that province this season. The rubber fields of the lower river, and especially in the islands, are slowly but surely failing, both in quantity and quality, but the decrease is more than made up by the development of new fields and the expansion of the old fields on the Upper Amazon. While all the more important tributaries of the Amazon are supplying their full quota of rubber, and even making a promising increase, interest will, he says, be centred in the now famous Acre territory and in South Eastern Ecuador. (*Indian Planting and Gardening*, July 18, 1903).

The Canadian Mail Steamer *Ocamo* sailed from Demerara on Wednesday with 6,570 bags of sugar and a large quantity of rum for the Canadian market. The S.S. *Yoruba* sails early to-morrow morning with about 3,900 tons of sugar for Montreal. (Demerara *Argosy*, August 22).

The Trinidad *Mirror*, of August 27, says:— 'Fair quantities of copra are now being shipped from Trinidad in execution of orders from England and the Continent. The prices paid locally are from $2·25 to $2·30 per 100 ℔. Merchants are looking forward to a steadily increasing trade in this product.'

The Jamaica Board of Agriculture has taken steps to appoint a Lecturer in Agriculture in succession to Mr. W. R. Buttenshaw, who was recently appointed Scientific Assistant on the staff of the Imperial Department of Agriculture. On the recommendation of Professor Liveing of Cambridge, the appointment has been offered to Mr. T. F. Feversham.

The London *Daily Mail*, of August 14, states that crops of almost all kinds are being affected by a plague of caterpillars, and in many parts of the country the damage done is beyond all hope of repair. The plague is supposed to be due to the fact that the almost entire absence of frost last winter allowed myriads of larvae to hibernate, and it is their descendants that are now playing such havoc.

The Grenada *Federalist*, of August 27, refers to a recent visit to Carriacou of the Hon. Edward Drayton, C.M.G., Administrator of Grenada, in the following terms:—

'He interested himself in everything connected with the well-being of the place, visited the settlements of the recently made peasant proprietors, and made, or set about making, arrangements for a central factory, where the cotton of the peasants could be cleaned at a given rate.'

The Grenada *Chronicle and Gazette*, of August 1, says:—'With reference to the efforts which are being made to encourage the cultivation of cotton in the West Indies, it is interesting to note that Australia is also likely to turn her attention the same way. A paper was recently read before the Geographical Society in Melbourne, in which it was stated that millions of acres in Northern Australia are suitable for cotton growing, both as regards climate and soil.'

An examination was recently held in Jamaica for the purpose of awarding the three recently instituted scholarships, tenable in connexion with the Agricultural course at the Government Laboratory. Nine candidates sat for the examination. The scholarships were awarded to S. W. Sharp, Duncans; A. B. Lindo, Montego Bay; and G. D. Goode, Port Royal.

The following extract is taken from the Report on Skerrets Farm, Antigua, for the year ended March 31, 1903:—'The Imperial Department of Agriculture erected a fowl house with suitable runs attached and imported five well bred trios of fowls from Canada. His Excellency the Governor also presented the Farm with one Buff Orpington cock and ten hens. There are at present on the Farm six pure breeds of fowls, and eggs from them have been readily bought by all classes of the community at 4*d.* each, the number sold for the three months being 377. Three Pekin ducks were also imported from Trinidad by the Imperial Department.'

EDUCATIONAL.

St. Vincent.

The half-yearly examination was held at the St. Vincent Agricultural School at the beginning of July. The results, on the whole, are decidedly encouraging. The average number of marks obtained by each boy was 71 per cent. among the seniors and 58·5 per cent. in the junior division. The following is the general report of the examiner (Mr. L. Lewton-Brain, B.A., F.L.S.):—

The general standard attained is distinctly satisfactory. The subjects appear to have been treated in a more practical manner, and there is less verbal identity in the answers. Care must be taken to avoid, as far as possible, the use of long or technical words; an instance of this is the use of the word 'flocculate' by nearly every boy in describing the effect of lime on clay soils. Glasgow and Derrick, who are bracketed head of the seniors, have done excellent papers throughout. Ollivierre, among the seniors, and George, among the juniors, are distinctly below the general standard. Ollivierre failed especially in the Arithmetic.

Dominica.

The half-yearly examination was held at this school in July. The results are not quite as satisfactory as at the other Agricultural Schools. This is probably due, in some measure, to the fact that the school was without an officer-in-charge for nearly three months previous to the examination.

The following is the general report of the examiner (Mr. L. Lewton-Brain):—

A very fair standard has been reached in geography, dictation and composition, but that attained in the science subjects and in arithmetic is noticeably lower; it would be better if this were reversed. Shillingford has done very fair papers throughout and well deserves his position at the head of the seniors; Elwin, who was first in December, has also done very well, but is weaker in the science subjects. Watty, Lawrence and Josse are at the bottom of the list and were near this in December. Green, who was last in December, has risen above Watty. The juniors are weaker than the seniors, but Leslie and P. Shillingford who were at the head in December, have done fairly well. Bellot, who has obtained very low marks, has been admitted since the last examination.

Lectures to Teachers at St. Vincent.

In the *Agricultural News*, Vol. II, p. 189, reference was made to a series of lectures on agriculture for Elementary school teachers at St. Vincent. The lecturer was Mr. C. H. Knowles, B.Sc., Resident Master of the Agricultural School.

The second lecture of the series was given on Saturday, September 5, when the following subjects were dealt with:—

Roots: Growth, structure and functions.
Stems: Growth, kinds of stems, cambium grafting.
Leaves: Structure, forms and functions.

The lecture was illustrated throughout by specimens and experiments. It is proposed to hold these lectures monthly, as far as possible. In the third lecture 'Air and Water' will be the subject.

DEPARTMENT NEWS.

At the request of the Government of Montserrat, Mr. Henry A. Ballou, B.Sc., the Entomologist on the staff of the Imperial Department of Agriculture, proceeded to that island in the R.M.S. *Solent* on the 31st. ult., in order to investigate diseases of cotton plants. Mr. Ballou is expected to return to Barbados to-day.

Mr. Henry Powell, Curator of the Botanic Station at St. Vincent, is at present on a tour in the northern islands for the purpose of studying the circumstances of the cotton industry at St. Kitt's, Antigua and Montserrat. Mr. Powell is due at Barbados on the 26th. instant and will return to St. Vincent soon after.

WEST INDIAN AGRICULTURAL CONFERENCE.

In reference to the proposal to hold the Agricultural Conference at Trinidad in January 1904, the following letter has been received from the Acting Colonial Secretary addressed to the Imperial Department of Agriculture:—

Trinidad, September 3, 1903.

Sir,

I am directed by the Governor to acknowledge the receipt of your letter No. T. 3,275 of the 29th. ult., in which it is suggested that, should circumstances permit, the annual Agricultural Conference might be held in this island in January next year.

2. His Excellency has directed me to state that he is in full sympathy with the desire to hold the Conference here, and to add that the epidemic appears to be dying out and there is every reason to hope that it will soon cease to exist.

I have, etc.,
(Sgd.) W. M. GORDON.

AGRICULTURAL SHOWS.

Dominica.

The Dominica *Official Gazette* of August 22, contains the report of the fifth Annual Agricultural Show, held at the Bath estate works on February 11 and 12, under the auspices of the Imperial Department of Agriculture and of the Dominica Agricultural Society.

The total amouut at the disposal of the Committee was £66 14*s.* 6*d.*, of which the sum of £37 4*s.* 4*d.* was paid to exhibitors in prizes.

The officers of the Imperial Department of Agriculture, as usual, superintended the erection of the stages, etc., and the boys from the Agricultural School rendered valuable assistance during the whole time of the show. A number of awards were secured by boys of the Agricultural School.

Honey. Mr. G. S. Hudson, the Agricultural Instructor at St. Lucia, reports:—

I have pleasure in advising that the first shipment of honey from St. Lucia sold (in tins) at 20*s.* per cwt. It was favourably reported on by the brokers. I consider this very satisfactory as it was Hog plum honey, which to my mind is one of the worst flavoured honeys we produce.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

Mr. J. R. Jackson, A.L.S., sends us the following notes on the state of the London Spice and Drug Market:—

In reviewing the trade in drugs and spices during the month of July, we have nothing of any special character to report. Supplies and prices have for the most part ruled very evenly, which is usually the case during the summer months, except perhaps in seasons when there is any special outbreak of sickness or disease, which often results in a 'run' upon some special remedy. Nothing of the kind, however, has occurred, and with the close of July and the holiday season in full swing, business generally is very quiet and will probably remain so for at least another month.

GINGER.

At the auction on July 1, 1,084 packages of Jamaica were offered and mostly bought in at full prices, only one or two small lots being sold, realizing for ordinary to middling from 41*s.* to 46*s.* 6*d.* 315 barrels of Cochin sold without reserve at 30*s.* to 31*s.* 6*d.* for rough ends, rough tips 34*s.*, and cut tips 40*s.* Good medium cut at 65*s.* and unassorted native, 55*s.* Selected was bought in at 85*s.* A week later the quotations stood thus: Middling to good Jamaica, 48*s.* to 52*s.*, and mouldy 41*s.* 6*d.* Of 533 packages of Cochin offered, 120 bags were sold, washed rough bright medium and small fetching 33*s.* to 33*s.* 6*d.* Calicut rough was bought in at 34*s.* and brown rough coated Nicaragua sold at 32*s.* At the sale on July 15, 700 packages of Jamaica were offered and 150 sold, good bold bright fetching 62*s.* to 65*s.*; ordinary dark and mouldy 38*s.* and damaged 35*s.* Of 718 packages of Cochin offered only 104 were sold, washed rough, fair medium and small fetching 31*s.* to 31*s.* 6*d.* At the close of the month the prices remained about the same with a slow demand for all kinds.

NUTMEGS AND MACE.

There was but little demand for these at the beginning of the month, when 148 packages of West Indian were offered, and 127 sold at the following rates: 54's at 2*s.* 6*d.*, 68's at 1*s.* 10*d.*, 71's at 1*s.* 6*d.*, 77's to 78's at 1*s.* 4*d.* At this sale 14 cases of Penang were offered and bought in 66's at 2*s.* 7*d.*, 69's at 2*s.* 5*d.*, and 110's at 1*s.* 1*d.* On July 15, 65 packages of West Indian were sold at rates varying but slightly from previous prices as follows: 70's to 73's 1*s.* 6*d.*, 75's 1*s.* 5*d.*, 83's 1*s.* 4*d.*, 104's 10*d.* Twelve cases of Penang were offered but did not sell, the prices quoted being 2*s.* 8*d.* for 63's and 1*s.* 9*d.* for 80's to 82's. At the last sale of the month very little change had taken place in the above figures. In mace but little business was done in the early part of the month, but at its close there was a fair demand at the following prices: 41 packages of West Indian were sold at 2*s.* 1*d.* to 2*s.* 3*d.* for good; 1*s.* 10*d.* to 2*s.* for fair; 1*s.* 8*d.* to 1*s.* 9*d.* for ordinary and 1*s.* 6*d.* to 1*s.* 7*d.* for pickings. Four cases of Penang were disposed of at this sale, fetching 2*s.* 9*d.* to 2*s.* 10*d.* for good bold, and 2*s.* 3*d.* for fair.

SARSAPARILLA.

At the drug sales on July 2, genuine grey Jamaica was reported scarce at from 1*s.* 3*d.* to 1*s.* 4*d.* per ℔. It was stated that about 12 bales of red native Jamaica had arrived, but no grey. At a later sale 1*s.* 2*d.* was paid for good fair Jamaica, slightly country damaged; while Lima Jamaica, rather chumpy, sold at 1*s.* per ℔. for sound quality. At the end of the month it was announced that several bales of red and yellow native Jamacia and 39 packages of grey Jamaica had arrived.

KOLA, ANNATTO, LIME JUICE, MUSK AND ARROWROOT.

With regard to kola, the drug was reported at the beginning of the month as very scarce in the London market, but a small parcel of dried West Indian was sold at Liverpool at 3*d.* per ℔. Later in the month, namely, on the 9th., 12 bags of small to medium bright to dark red sound West Indian were sold privately, the price not being announced.

Of annatto, 21 bags were sold on July 9, $2\frac{3}{4}$*d.* being obtained for fair sorts, and for dood dark red dry Madras $3\frac{1}{4}$*d.* per ℔.

At the beginning of the month, the demand for West Indian distilled oil of lime was well maintained at the rate of 1*s.* 9*d.* for good quality.

With regard to lime juice, the sale of good pale juice in the middle of the month had realized 1*s.* 4*d.* to 1*s.* 6*d.* per ℔., and it was stated that owing to the blight in the West Indies, from which the trees were reported to be suffering, the price would still go up.

Three cases of musk seed of usual quality were offered at the sale on the 9th. of the month: the price asked being limited to 1*s.* 2*d.* per ℔., a bid of 8*d.* was refused.

At this sale one box containing 35 ℔. of papaw juice was sold at 10*s.* per ℔.

At the last auction at the end of July some 450 packages of St. Vincent arrowroot, including good manufactory, were bought in at $2\frac{1}{4}$*d.* Tins sold at $3\frac{1}{4}$*d.* for good, while 6 half-barrels of Bermuda out of a total of 29 sold at 1*s.* 5*d.* per ℔.

In connexion with drugs, it may not be out of place to refer to the extension of the uses to which the banana seems to be adapted, other than that of wholesome and popular fruit. Quite recently a new food for infants, invalids and the aged has been put before the public under the name of 'Banannia' which is said to be manufactured in Cuba from the freshly gathered fruit, by a system which concentrates all the nourishing properties, no other ingredient of any kind being added. Another food of a similar nature under the name of 'Banana Malted Food' is said to be 'prepared from the finest Jamaica bananas' combined with malt. Both forms are now being put forward as ideal foods for invalids.

A NEW BOTANICAL RESEARCH LABORATORY IN THE TROPICS.

Writing under the above heading in the *Botanica Gazette*, Professor Went, of the University of Utrecht, Holland, gives an account of a scientific laboratory that will be opened this year at Paramaribo in Surinam. We take the following extracts from Professor Went's paper:—

I wish to draw the attention of American botanists to this laboratory, because it will contain a room where foreign naturalists will have the opportunity of research work.

It will be built in the small experiment garden now existing, which is in great part uncultivated, with an interesting secondary forest. In the vicinity may be found tidal and swamp forests. In the neighbourhood of the coast are the European cacao and sugar estates. Bordering the rear of these estates are primeval forests, which cover a great area of the colony; they are perhaps more luxuriant than any in the world. Whoever intends to make a stay in the new laboratory will have to apply to the Agricultural Inspector in Paramaribo, whose appointment will be made shortly and will be announced in the botanical journals.

MARKET REPORTS.

London,—August 18, 1903.—Messrs. Hales Caird & Co., Messrs. E. A. de Pass & Co., Messrs. Kearton, Piper & Co., 'The Public Ledger,' August 15, 1903, and 'The Weekly Cotton Circular,' August 14 1903.

Aloes—Curaçoa, 14/6 to 30/- ; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, $1\frac{3}{4}$*d.* to 4*d.* per ℔. Bermuda, 1/3 to 1/8 per ℔.
Balata—1/11$\frac{1}{2}$ to 2/6 per ℔.
Bees'-wax—£7 7*s.* 6*d.* to £8 per cwt.
Cacao—Trinidad, 57/- to 71/- per cwt. ; Jamaica, 46/- to 58/6 per cwt. ; Grenada, 48/- to 57/6 per cwt. ; Dominica, 48/- to 56/- per cwt. ; St. Lucia, 48/- to 56/- per cwt. ; Demerara, 56/- to 60/- per cwt.
Cardamoms—Mysore, 1/4 to 3/- per ℔.
Coffee—Jamaica, 26/- to 65/- per cwt.
Cotton—West Indian, $6\frac{5}{16}$*d.* to $6\frac{7}{8}$*d.* ; Barbados, Sea Island, $13\frac{1}{2}$*d.* per ℔.
Fruit—
  Bananas—7/- to 8/- per bunch.
  Oranges—Jamaica, 9/- to 12/- per case.
  Pines—Antiguas, 11/- to 14/- per barrel ; Jamaicas, no quotations.
Fustic—£3 to £5 per ton.
Ginger—Jamaica, 37/- to 68/- per cwt.
Honey—Jamaica, 16/ to 25/ per cwt.
Isinglass—West Indian lump, 2/1 to 2/10 ; cake, 1/4 per ℔.
Kola Nuts—1*d.* to 4*d.* per ℔.
Lime Juice—Raw, 10*d.* to 1/3 per gallon. Concentrated, £15 10*s.* to £16 per pipe.
Logwood—Jamaica, £4 to £5 ; Honduras, £5 10*s.* to £6 15*s.* per ton.
Mace—1/9 to 3/- per ℔.
Nitrate of Soda—Agricultural, £9 12*s.* 6*d.* per ton.
Nutmegs—70's to 75's, 1/7 to 1/9 ; 80's to 90's, 1/1 to 1/8 per ℔.
Pimento—$2\frac{1}{4}$*d.* to 3*d.* per ℔.
Rum—Demerara, 8*d.* to 11*d.* per proof gallon. Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—Jamaica, 8*d.* to 1/2 ; Honduras, $11\frac{1}{2}$*d.* to 1/3 per ℔.
Sugar—Muscovado, 10/3 to 13/6 ; Crystallized, 15/- to 16/6 per cwt.
Sulphate of Ammonia—£12 5*s.* to £12 6*s.* 3*d.* per ton.
Tamarinds—Barbados, 10/6 to 13/- ; Antiguas, 7/6 to 8/6 per cwt.

Halifax, N.S.,—August 13, 1903.—'The Maritime Merchant.'

Ginger—Jamaica, 24c., pure bulk.
Hay—$12·00 to $15·00 per ton.
Nutmegs—50c. to 60c.
Pine-apples—$1·50 to $2·25 per dozen.
Tomatos—$1·60.

St. John, N.B.,—August 13, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 42c. to 44c. ; Barbados, 37c. to 40c. per gallon.

New York,—August 21, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, $1·30 ; eight hands 95c. ; seven hands, 65c. per bunch.
Cacao—African, $11\frac{3}{4}$c. to 12c. ; Caracas, $12\frac{3}{4}$c. to $13\frac{1}{2}$c. ; Jamaica, $9\frac{3}{4}$c. ; Grenada, 12c. to $12\frac{1}{4}$c. ; Trinidad, 12c. to $13\frac{1}{4}$c. per ℔.
Cocoa-nuts—Trinidads, $25·00 to $26·00 ; Jamaicas, $25·00 to $27·00 per M.
Coffee—Jamaica, fair to good ordinary, 5c. to $5\frac{1}{2}$c. per ℔. ; Manchester grades, $7\frac{1}{2}$c. to $9\frac{1}{2}$c. per ℔.
Ginger—Jamaica, $7\frac{1}{2}$c. to $8\frac{1}{4}$c. per ℔.
Goat Skins—Jamaicas, 50c. to $53\frac{1}{2}$c. per ℔.
Pimento—6c. to $6\frac{1}{2}$c. per ℔.
Rubber—Nicaragua scrap, 71c. to $71\frac{1}{2}$c., Guayaquil strip, 64c. per ℔.
Sugar—Muscovados, 89°, $3\frac{5}{16}$c. ; Centrifugals, 96°, $3\frac{13}{16}$c. Molasses, 89°, $3\frac{3}{16}$c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—August 29, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·75 per 100 ℔.
Cacao—$14·00 per 100 ℔.
Cocoa-nuts—$15·00 per M. (Husked nuts).
Coffee—Jamaica and ordinary Rio, $7·50 to $9·00 per 100 ℔.
Hay—New Brunswick, 80c. to $1·00 per 100 ℔.
Manures—Nitrate of Soda $57·00 to $65·00 ; Ohlendorff's Dissolved Guano $60·00 ; Sulphate of Ammonia $76·00 to $85·00 ; Sulphate of Potash $67·00 per ton.
Molasses—No quotations.
Onions—Madeira, $1·75 to $2·00 per 100 ℔.
Potatos, English—$3·00 to $3·75 per 100 ℔.
Rice—Ballam, $4·25 to $4·50 per bag (188 ℔.) ; Patna $3·50 per 100 ℔. ; Rangoon, $2·60 to $2·80 per 100 ℔.
Sugar—In hogsheads, $1·50 per 100 ℔., and $5·00 for hhd.

British Guiana,—August 27, 1903.—Messrs. Weiting & Richter.

Arrowroot—St Vincent, $9·50 per barrel.
Cacao—Native, 11c. to 12c. per ℔.
Cassava Starch—$8·50 to $9·00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, $10\frac{1}{2}$c. to 11c. per ℔. (retail).
—Creole, 10c. to 11c. per ℔.
Dhal—$3·10 to $3·15 per bag of 168 ℔.
Eddoes—$1·68 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon, casks included.
Onions—$2\frac{1}{4}$c. to $2\frac{1}{2}$c. per ℔.
Pea Nuts—Curaçoa, $3\frac{3}{4}$c. ; American, 5c. per ℔. (retail).
Plantains—20c. to 40c. per bunch.
Potatos, English—$2·00 per barrel.
Rice—Ballam, $4·50 to $4·70 ex store ; Patna and Seeta, $5·60 to $5·75 per bag.
—Creole Rice, 20c. to 22c. per gallon (retail).
Sweet Potatos—Barbados, 96c. per barrel.
Tannias—$1·80 per bag.
Yams—White, $2·40 per bag.
Sugar—Dark Crystals, $1·87$\frac{1}{2}$ to $1·92$\frac{1}{2}$; Yellow, $2·15 to $2·25 ; Molasses, $1·70 to $1·90 per 100 ℔.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—August 27, 1903.—Messrs. Gordon Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Venezuelan, 41c. to 42c. per ℔.
Cacao—Ordinary, $12·25 to $12·75 ; Estates, $13·00 to $13·50 per fanega.
Coffee—5c. to 6c. per ℔.
Copra—$2\frac{1}{4}$c. to $2\frac{1}{2}$c. per ℔.
Onions—$1·75 to $2·10 per 100 ℔.
Potatos, English—$1·50 to $1·80 per 100 ℔.
Rice—Yellow, $4·25 to $4·75 ; White Table, $5·50 to $6·00 per bag.
Sugar—No quotations.

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Sugar-cane Experiments at Barbados.

A special meeting of the Barbados Agricultural Society was held on Friday, September 11, for the purpose of enabling Professor 'Albuquerque and Mr. J. R. Bovell to give an account of the results of the sugar-cane experiments carried on in Barbados during the season 1902-3, under the direction of the Imperial Department of Agriculture.

In presenting the report, Professor d'Albuquerque expressed thanks on behalf of Mr. Bovell and himself to the proprietors, attorneys and managers of estates for their assistance in carrying out the experiments. The very unfavourable weather that prevailed during the season had a serious effect upon the results. The rainfall in December 1901 was good, and in consequence the cane plants germinated fairly regularly, but as the first four months of 1902 were dry, the young canes made very little progress, and in some districts many of the plants died. Although favourable weather was experienced from May to the end of August, in September another drought set in, which lasted to the end of November. The effects of these two droughts, together with the root disease *Marasmius* greatly reduced the value of many of the cane experiments for the season. The varieties of canes were grown on nine estates, eight of the plots being on black soils, viz: Coverley, Dodds, Husbands, Hampton, Oughterson, Pine, Sunbury and Waterford, and one, Henley, on red soil. The varieties cultivated were B. 373, B. 619, B. 208, B. 393, B. 635, Rock Hall, B. 147, B. 390, Jamaica, Sealy Seedling, B. 645, B. 379, B. 254, White Transparent, B. 376, D. 95 and Sport White.

As a result of these experiments, the Barbados Seedling cane 208 had, on the whole, maintained the first place both as to yield, richness and purity of juice. Planters would be justified in extending its cultivation on a small scale on their estates. The White Transparent and B. 147 ran almost neck to neck in yield, but the latter was slighty behind in the richness and purity of its juice. On the whole, therefore, the results confirmed those of previous years.

With regard to the manurial experiments, it was reported that these had been carried on under most unfavourable weather conditions. In addition to the small manurial plots on three estates, forty larger plots had, through the kindness of Mr. A. Cameron, been laid under experiment. These plots were each 1 acre in extent. On the whole, the results of the season's experiments with manures were confirmatory of those of former years and there was no need to modify at that stage the recommendations already made. Whereever manures had this season given increased yield it was due to active nitrogen and in a lesser degree to phosphates and potash.

Mr. J. R. Bovell addressed the meeting on the subject of the root disease of the sugar-cane. Since the White Transparent had taken the place of the Bourbon, an increasing number of canes might be noticed with the leaf sheaths firmly adhering to the stems. On examination it would be seen that the sheaths were cemented together by thin white threads. These were the mycelium of a fungus. If stools of such canes were examined during the rainy season, toadstools would be seen growing from the leaf sheaths; these contain the spores of the fungus. On stripping off the sheaths, it would be found that the oldest roots were dry and corky and that the growth of some of the others had been arrested. This fungus was known as *Marasmius Sacchari,* and was the cause of the sugar-cane root disease, which was becoming prevalent in Barbados.

Mr. Bovell was of opinion that the fungus was, to a great extent, responsible for the poor yield obtained during the season. This fungus was spread by spores, by planting infected cuttings and by the mycelium passing through the soil from one stool to another, and could only be got rid of by starving it out, that is by planting crops, such as cotton, onions, sweet potatos and bananas, upon which the fungus could not live; care should also be taken that infected trash and tops were not put into the manure pens to be afterwards applied to healthy fields.

SUGAR INDUSTRY.

Sugar-cane Experiments at Barbados.

The following is a progress report on the Sugar-cane experiments at Barbados, prepared by Professor d'Albuquerque and Mr. J. R. Bovell, for the half-year, January to June, 1903:—

For the period under review there are 10,736 experiments, covering an area of 288½ acres, to be reported on. The experiments may, for the sake of convenience, be divided into two groups. The first consists of the experiments which were brought to a close during the half-year, and the latter those which will end either during December 1903, or during the half-year ending June 30, 1904.

As a detailed list of the first group was given in the last report (*Agricultural News*, Vol. II, p. 74), there is no necessity for reproducing it here; suffice it to say, that with some exceptions, for instance where new seedlings canes were not replanted, the whole of the plots therein enumerated were reaped, the canes weighed and the juice analysed. A report of the results will be submitted in due course.

The following is a detailed list of the Stations of the second group giving the number of plots and areas under experiment.

EXPERIMENTS WITH MANURES.

Of the 111 manurial plots, covering an area of 14·7 acres, twenty-six are in 'Lower Bay Tree' field at Dodds, thirty-three in 'Flat' field at Foursquare, and fifty-two in 'Jack-in-the-box' and 'Fletcher' fields at Hopewell. With the exception of twenty-seven plots of first ratoons in 'Fletcher' field at Hopewell, all these plots are plant canes.

By the kind permission of Mr. A. Cameron, the following thirty-five manurial plots extending over an area of 34·4 acres are being conducted on the estates of Messrs. T. Daniel & Co., Ltd., and the Rev. Henry Daniel and others. Of these, eight are at 'Foursquare', eight at the 'Ruby,' ten at 'Hampton' and nine at 'Blowers'.

On the whole, the canes on the manurial plots have grown fairly well, but owing to the presence of the root fungus in many of the fields, the canes are uneven and irregular. On one estate the root fungus was present to such an extent that the experiments in one field have been discontinued, and are therefore not included in the above return.

EXPERIMENTS WITH SELECTED SEEDLING AND OTHER CANES.

Of this group of the experiments, containing 148 plots and having an area of nearly 10 acres, there are at 'Henley' twenty plots of plant canes in 'Swamp' field and twenty-four plots of first ratoons in 'Todds Line' field. At Coverley, sixteen plots in 'Suck Hole' field; at Applewhaites, twenty plots in 'Long Ground' field; at Waterford, twenty plots of plant canes in 'Forster' field, and twenty-four plots of first ratoons in 'Burnt' field, and at Husbands twenty-four plots of plant canes in 'Cottage' field.

On the whole these plots started to grow well, but lately the root fungus seems, in some instances, to be checking their growth.

EXPERIMENTS WITH SEEDLING CANES OTHER THAN FIRST YEAR AND DIFFERENT NAMED VARIETIES.

In this section of the experiments there are 2,771 plots with an area of 18½ acres. At Dodds there are 2,560 plots of plant canes in the following fields, viz: 'Lower Chapel' thirty-eight, 'Well' 602, 'Mill' 516, 'Lemon

Tree' 982, 'Pasture' 412 and 'Porch Door' ten. In 'Murray' field at Sunbury twenty-five, in 'Nat Valley' at Hampton eighteen, in 'Cut Hill' field at Hannays twenty-four, in 'Old Work' field at Yorkshire thirteen, in 'Middle' field at the Ridge twenty-five, in 'South Nineteen Acre' field at the Pine eighteen, in 'Long Pond' field at Brighton sixteen, in 'South Ginger' field at Oughterson seven, in 'Simmons' field at Lower Estate thirteen, in 'Well' field at Claybury nineteen, in 'Cliff' field at Clifton Hall eighteen, and in 'Forster' field at Waterford fifteen.

The whole of the plots in this section grew fairly regularly, but here and there the root fungus is checking their growth.

EXPERIMENTS WITH SEEDLING CANES IN THE FIRST YEAR'S GROWTH.

Of the 4,000 young seedlings, which in our last report were mentioned as being pricked off into pots, 2,827 are now growing in 'Pear Tree' field at Waterford. In addition to these seedlings, there are growing in the same field eighteen holes of the Black sugar-cane from Jamaica, six holes each of a striped and yellow cane from Egypt, kindly given by Mr. T. J. Wilkinson, of Messrs. Wilkinson & Co., 156 holes of the Collynns seedling, fifty-one holes of ten seedling canes and three holes of an Elephant cane received from British Guiana. This Elephant cane was tested many years ago when the sugar-cane experiments were first started in Barbados, under the name of Elephant B., in distinction to another cane received from Jamaica, also named Elephant, which was known as Elephant J. Judging by size, the Elephant B. has the greater claim to the name 'Elephant' as it is about twice as large as the one obtained from Jamaica.

CHEMICAL SELECTION PLOTS.

Two plots of these canes, taken from the chemical selection canes reaped in May last, were, with the permission of Mr. H. E. Thorne, M.C.P., replanted at Sandy Lane plantation in a field which can be irrigated.

The cuttings were divided into two groups; one group being cuttings taken from the canes of the year before which were richest in saccharose, and the other from the canes least rich.

West Indian Sugar in Canada.

The following information respecting West Indian sugar in the Dominion of Canada has been furnished by Mr. T. Russell Murray, formerly of Port-of-Spain, Trinidad, recently appointed Correspondent of the Imperial Department of Agriculture at Montreal:—

The sugar market in Canada has its centre mainly in Montreal: here are situated the largest refineries. Eighty per cent. of the sugar used in Canada is white granulated beet and is imported from Europe and the United States, both refined and raw. A small quantity of beet is being grown in Canada for local manufacture; but considerable doubts are being expressed regarding the prospects of beet growing. To a large extent, the sugar market throughout the Dominion is subject to trade conditions, governed, in the main, by the sugar refiners, who only sell, through brokers in the various cities, to the wholesale grocery trade and manufacturers, who in turn supply the retail trade. Under such circumstances, it is largely incumbent upon the lesser to deal with the greater to ensure continuous business; hence certain difficulties are encountered in introducing high grade West Indian sugar for table use, as it cuts out the Canadian refined and naturally interferes with the linked relationship of the wholesale trade to the refiner, and the wholesale with the retail trade.

There is, however, a general feeling among consumers in favour of cane sugar, and it lies with the West Indian planters to produce a good, bright, yellow, soft sugar with not much crystal and uniform in colour. The colour, once above the 16 Dutch standard, should be as bright a yellow to primrose colour as possible. For summer and autumn fruit preserving, the colour is not so important; but dark sugars are extremely difficult to sell to refiners.

The position of the tariff is as follows, say for an 88° under Dutch standard for German beet:—

British West Indian 88°		German Beet 88°	
Duty 75°	40c.	Duty on 75°	40c.
„ 13 @ 1½c.	19½	„ on 13 @ 1½c. per°	19½
88°	59½	88°	59½
less preferential, say	20	add 30 % surtax, say	17¾
	39½		77¼

or 37¾c. per 100 ℔. in favour of the British West Indian.

For sugar *above* 16 Dutch standard, duties work thus for, say, 88°:—

Duty $1·08 per 100 ℔., and for over 81°, 1¼c. per each degree.

For the encouragement of refiners in Canada the tariff stands as under:—

In Canada.	Duty on Austrian granulated beet and bags	$1·28		
	Duty on Austrian raw beet and bags	·62½		
				65½c.
In United States of America.	Duty on Austrian granulated beet	$1·95		
	Countervailing against export bounty	·29		
			$2·24	
	Duty on raw beet from Austria	$1·55		
	Countervailing duty	·20		
			$1·75	
	Protection given to United States refiners			49c.
	Balance			16½c.

Hence Canada gives 16½c. per 100 ℔. more protection than the United States, and under such auspices, Canada offers a better market for British West Indian sugars than even the United States.

THE SEALING WAX PALM.

The Sealing Wax palm *(Copernicia cerifera)* is a native of Brazil. It grows to a great height and from it is obtained a hard wood which is put to a variety of uses. Its leaves are coated with a waxy substance, which can be removed by shaking. The wax is then melted and run into cakes. It has been used for making candles, which, however, are somewhat discoloured. Other parts of the tree are also useful; the young stems yield a kind of sago, while the leaves are used, when young, as fodder for stock.

Specimens of this tree are to be found in the Botanic Gardens at British Guiana, and seeds have been distributed from them to the Botanic Stations throughout the West Indies.

WEST INDIAN FRUIT.

TROPICAL FRUITS IN ENGLAND.

We take the following extracts from an article that appeared in the London *Standard* of August 31:—

It is stated that we are at last about to receive a large and regular supply of mangos. Why this most delicious of the common tropical fruits has not been familiar in Europe for years was always a puzzling question for those who thought upon the matter. Hitherto there has been no regular export to Europe, and the small parcels that arrived mostly belonged to those villainous species which taste of turpentine. However, the good sorts are so common nowadays that we ought to have had the fruit in abundance ever since 'cold storage' was introduced.

Trinidad has now come to the rescue, and a large consignment is on its way as a first instalment. In the tropical countries of either hemisphere, besides the many species cultivated, an intelligent caterer often serves a dish of fruit, which he cannot name. These are 'jungle fruits', always small, and nearly always delicious. Perhaps at some future day they may be cultivated. A traveller in Costa Rica once sent his servant to buy fruit and the man brought back five species, all resembling the medlar in taste, yet utterly different in form though all agreeable. No one in the hotel could name one of them.

But it is not creditable to the enterprise of our business men, that scores of fruits, common and valued in the European settlements, have never been sent home. The explanation always offered is that nobody would buy them. The first consignment might be a loss; but it is not likely that, at a time when people strive so hard for something new in their entertainments, such exquisite fruits would not sell. The true reason is want of enterprise—nobody has thought of it. Of course most of these products would not have borne the journey in former days. Mangosteens, which are so commonly pronounced the best of all, will not bear it now, they say. We should feel more confident on this point if assured that the experiment has been tried more than once on a large scale.

We cannot keep feeling that the writer, in his complaints with regard to lack of enterprise, fails to realize the serious difficulties in the way of fostering a trade in perishable fruits. It is these difficulties that will always stand in the way of any attempts to place upon the market tropical fruits of a perishable nature at popular prices. Moreover, the writer omits to note that such tropical fruits as bananas, pine-apples and oranges are already exported on a very large scale.

PINE-APPLES AT ANTIGUA.

Mr. W. N. Sands, Curator of the Botanic Station, Antigua, sends the following note on the experimental cultivation of pine-apples in that island:—

Three new varieties of pine-apples were received last mail from the Porto Rico Experiment Station of the United States Department of Agriculture. The varieties, which are known as Cabezona, Pan de Azucar and Caraquona, should form a valuable addition to the varieties of pine-apples grown in the island.

They have been planted at Dimsdale estate, where a special plot of all the varieties in cultivation in the island is being formed for further experimental purposes.

It might also be mentioned that suckers of these varieties have been planted out at the Dominica Botanic Station.

ORANGES IN PORTO RICO.

The *Report on the Trade and Commerce of Porto Rico for the year 1902*, by the British Consul, has the following reference to the orange industry:—

During the past two years, it is said, more than 3,500 acres have been planted in oranges in small holdings. Everything in the island appears to be favourable to orange cultivation. Soil is suitable, labour is plentiful, market is near, and frost, the dread of the mainland orange growers, is unknown. It is estimated that the island soil will bear some 70 trees to the acre, which, at five years old, should produce 35,000 oranges.

Any quantity of land suitable for the cultivation of oranges and lemons can be obtained at \$5·00 to \$15·00 per acre.

A FRUIT WRAPPING MACHINE.

The *Maritime Merchant*, of August 13, has the following note:—

A machine for wrapping oranges and other fruits with paper has recently been perfected and is being installed in some of the large orchards and packing sheds of California and Florida. The machine is run either by hand or power and has a capacity of 25,000 to 40,000 oranges per day. The paper is fed from the endless roll and the machine will wrap fruit from the size of marbles upwards and will handle eggs without breaking them. With such a machine the cost of wrapping is much reduced.

COTTON.

Cotton Disease at Montserrat.

The following information, respecting a disease affecting cotton at Montserrat, is taken from a report presented by Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture. Mr. Ballou visited Montserrat for the purpose of investigating the disease and advising in respect of the efforts to deal effectively with it.

Mr. Ballou's report, which is addressed to the Imperial Commissioner of Agriculture, is as follows:—

I have the honour to submit, herewith, a brief report on a visit, made at your request, to Montserrat from September 2 to 10, to investigate the disease of cotton caused by a leaf-gall mite, *Phytoptus* sp. This disease was first reported to the Department in July last, and specimens were sent in at that time.

Arriving at Montserrat early on the morning of September 2, I called on his Honour the Commissioner, and with the assistance of Mr. C. Watson began investigations, the results of which are briefly stated below.

Origin. The origin of the pest in this island is, at present, unknown.

Food plants. Careful search has failed to reveal any food plants of this mite, besides the cultivated cotton.

History. During July last, this disease developed to such an extent at Dagenham estate, near Plymouth, as to destroy several fields of ratoon cotton. Specimens were submitted to this Office, and Mr. Watson stated, in a letter accompanying the specimens, that he was pulling up ratoons and destroying them. Since that time other fields of ratoons have been destroyed, until at present 37 acres of ratoons and 8 acres of young plant cotton have been destroyed on account of this mite. These were all at Dagenham. Several acres of ratoons have been pulled up at the Windward for the same reason. At the present time the area planted in cotton in Montserrat is said to be about 700 acres. Most of this is growing in infested localities, and, probably, much the larger part in fields, some portions of which are already attacked.

Occurrence and spread. In each infested locality the disease made its first appearance in fields of ratoon cotton, and in every instance its spread has been in the direction of the prevailing winds, the spread in any other direction being very slight and slow.

Cause of the disease. The cause of the disease is a small mite, more closely related to the cattle ticks, red spiders, itch mites, etc., than to true insects. It is invisible to the naked eye, and even with the best pocket lens can be seen only with difficulty.

Appearance of the disease. The disease appears most commonly on the leaves, causing them to become so crumpled and deformed as almost to lose their resemblance to cotton leaves. The irritation induced by the presence of the mite causes the plant to send out adventitious epidermal hairs in great numbers. Subsequent growth produces a gall almost or quite closed, in which the animal feeds and lays its eggs. These galls are, at first, nearly of the colour of the leaf or stem on which they occur, but later take on a bright reddish colour and still later turn a dull brown and become dry and corky. At this time these galls open, and the adult mites, coming to the surface of the leaf, may be blown about. The galls occur on all parts of the plant except the root, having been found on leaf, stem, leaf-stalk, flower, pod and the bracts surrounding the pod.

Previous occurrence. So far as I have been able to determine, this is the first time that this disease has ever appeared on the cotton, and therefore all remedies, for the present at least, must be applied experimentally.

Remedies. It is strongly recommended that all ratoon cotton be destroyed without delay, and that no ratoons be grown in the island for at least several years. Dry lime, dry sulphur, kerosene emulsion and whale-oil soap solution have been tried on a small scale, but sufficient time has not yet elapsed to make possible any estimate of the relative values of these substances.

Mr. Watson has begun the application of a lime wash on a large scale, and will try sulphur, both as a wash by itself and in combination with the lime. It is believed that the most efficient material must be one that will act as a deterrent, since the mite, once established, is so well protected by the gall it inhabits, as to be entirely out of the reach of the ordinary contact poisons. Lime and sulphur may therefore be expected to give the best results.

Conclusion and comment. In conclusion, I would state that it seems to me that this is by far the most serious pest of cotton, that I have yet observed, and that, unless means of control are found, it will become more serious in the future than it is at present. Much remains to be learned of its life history, means of control, etc.

I desire to express my thanks to his Honour F. H. Watkins, the Commissioner of Montserrat, for the kind interest which he took in my work, and to Mr. C. Watson, who did his utmost to help in every possible way, providing materials and labourers for experiments, as well as accompanying me to cotton plantations, and to the surrounding hills and wild lands, and supplying all information as to the occurrence and development of the disease previous to my visit.

On my return journey to Barbados, I found that the Sea Island cotton at the Agricultural School at St. Lucia was more or less infested with the same disease. The disease has since been reported from St. Kitt's.

ONION CULTIVATION AT ANTIGUA.

Mr. W. N. Sands, Curator of the Botanic Station, has forwarded the following note in reference to the onion seed, recently obtained by the Imperial Department of Agriculture from Teneriffe:—

Good planting weather has been experienced during the last fortnight and practically all the onion seed (150 ℔.), lately received from Teneriffe, has been sown.

The seed has germinated very well. Tests made at the Botanic Station showed a germination percentage of 83 in the case of the White Bermuda variety and of 90 with the Red.

These results are very satisfactory and indicate once more the thorough reliability of the seed obtained through the Department.

Another feature has been its quick germination. The seedlings usually take about eight days before they show above the soil; this year, however, they made their appearance at the end of five days. This is another indication that the seed was fresh and vigorous.

SCIENCE NOTES.

The Tamarind.

The Tamarind *(Tamarindus indicus)* is well known throughout the West Indies. It is a tall ornamental tree, and one eminently suited to planting around houses as a shade tree.

Introduced from the East, it is now cultivated in all tropical countries. Few trees have such a variety of uses; nearly every part can be utilized in some manner. The fruit, seeds, leaves and flowers all serve for food purposes; while medicinally are used the fruit, leaves, flowers and bark. Further, the wood possesses considerable commercial value, and its fragrant little flowers cause the tree to be a useful ally of the bee-keeper.

The tamarind is grown principally for its hard-shelled fruit, which is filled with an acid pulp. The cause of the acidity is the presence of tartaric, citric, and other vegetable acids. The medicinal value of the fruit is due to its cooling and laxative qualities, which are of assistance in febrile cases. Tamarinds are commonly used for preventing and curing scurvy, while a gargle made from them is effective in relieving sore-throats.

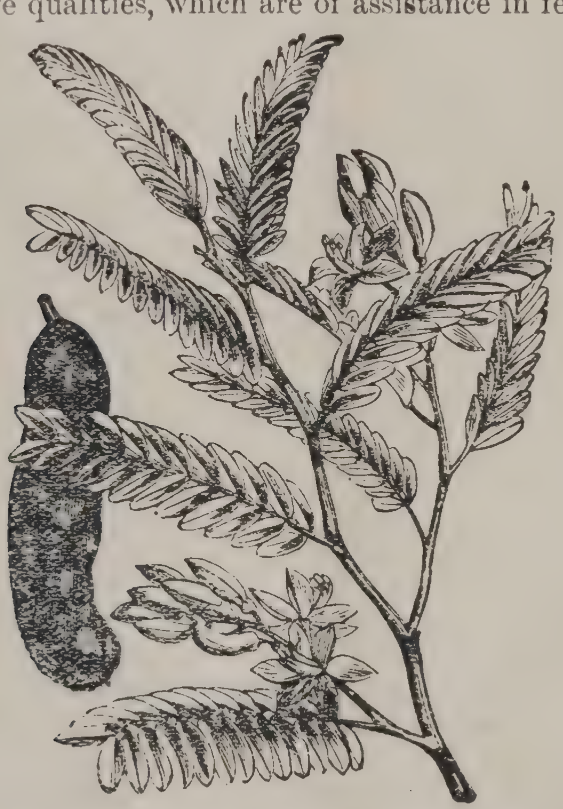


Fig. 30. *Tamarindus indicus*, showing leaves, flowers and pod. (From *Kew Guide.*)

The method of preparation adopted in the West Indies is very simple. The pods are shelled and the pulp is placed in large jars with sugar, layers of pulp and sugar alternating. Boiling syrup is then poured over the whole mass.

Considerable quantities of tamarinds are now exported from the West Indies to Europe and America. In the case of Antigua this is becoming an important minor industry. As stated in the *Agricultural News*, Vol. II, p. 246, during the year ended March 31 last, 1,902 barrels of tamarinds, valued at £1,042, were exported. The price obtained for this product in the London market has varied from 9*s.* to 14*s.* per cwt. Barbados exported tamarinds during the year 1902 to 1903 to the value of £688. Small quantities were also sent from Jamaica, Dominica and St. Kitt's-Nevis. Considering how universal the tamarind is throughout the West Indies and the amount of fruit borne even by a single tree, there is no doubt that the exports in this article might be very considerably increased.

The tamarind also yields valuable timber. Its beautifully grained heart-wood is much sought after for furniture making: while for building purposes, the wood has the advantage of not being attacked by insects. It is also much prized for fuel purposes, where great heat is required, and the charcoal made from tamarind wood is preferred in the manufacture of gunpowder.

We desire to bring the varied uses of this tree before our readers, especially those who are interested in the Arbor Day movement, as there are few trees in the West Indies whose claims are more worthy of recognition by the tree planter.

Bacteria and Milk.

It is a well-known fact that milk forms an excellent nutrient medium for the growth of certain bacteria, some of which are harmless, others are disease producing, while others cause the souring of the milk itself.

It has been noticed, however, by certain observers, that the number of bacteria in a sample of milk sometimes decreases slightly during the first few hours after the milk is drawn from the cow. This has been supposed to be due to the presence in milk of a 'germicidal substance', which after a time became exhausted.

Recently the subject has been worked at by Messrs. H. W. Conn and W. A. Stocking of the Agricultural Experiment Station, Storrs, Connecticut, and their results are published in the *Revue Générale du Lait*, II, 1903.

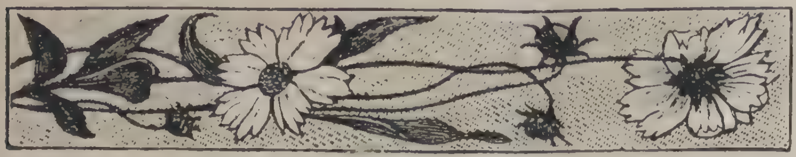
These observers come to the conclusion, after numerous experiments, that there is no need to assume the presence of any special germicidal substance in fresh milk, but that the explanation is much more simple.

Out of the many varieties of bacteria that are found in fresh milk, a number are well adapted to grow there, while others do not find in milk a congenial habitat. These latter therefore do not multiply, while the others multiply rapidly from the start. Moreover, in ordinary milk, the number of bacteria, which are adapted to grow there, is considerably less than the number of those not so adapted. Consequently during the first few hours, the varieties which are adapted to milk, although multiplying, do not multiply rapidly enough to make up for the dying off of the others. The result is that the total number of bacteria decreases during the first few hours. After this time, the favoured varieties multiply so rapidly as to make up for the loss of the other forms. Later the multiplication is so rapid that there is a constant and rapid increase in the total number of bacteria.

STORING SWEET POTATOS.

The *Queensland Agricultural Journal*, for July, gives the following directions for keeping sweet potatos:—

The potatos must be thoroughly ripe before putting them away. They may be known to be ripe by the milky juice, which exudes from a broken potato, remaining white on exposure to the air. If it turns dark, the potato is not ripe. When dug, spread the tubers out in the field or in the barn for several days to cure. Then lay down a thick layer of sand, on which place a layer of tubers. Then pour sand over them till they are completely covered and every crevice is filled. Next, put down a second layer of tubers on top of the sand; pour in sand again as before, and continue the work until all the tubers are put away. This excludes the air, and the potatos are safe, and will keep in ordinary weather right through the winter. The main points to be observed are, perfect ripeness and sufficient curing.



BOTANICAL LABORATORY AT JAMAICA.

The following letter from Dr. N. L. Britton, the Director-General of the New York Botanical Garden, addressed to the Imperial Commissioner of Agriculture, contains an interesting account of what is proposed to be done to establish a botanical laboratory at Jamaica.

The letter is published in full, in order to afford wide circulation as to the objects of the proposed laboratory, and the advantages it will afford to students who wish to make themselves thoroughly acquainted with the rich flora of the western tropics.

It is especially desirable to bring the subject under the notice of British students, who may wish to take advantage of the exceptional opportunity offered to them.

It may be mentioned that Jamaica can be reached by Royal Mail steamers leaving Southampton, and by the Direct line of steamers from Bristol, once a fortnight.

It would be convenient if British students who desire to study at the Jamaica botanical laboratory would, in the first instance, communicate with the Imperial Commissioner of Agriculture for the West Indies, at the Head Office, Barbados:—

THE DIRECTOR OF THE NEW YORK BOTANICAL GARDEN—TO THE IMPERIAL DEPARTMENT OF AGRICULTURE.

New York Botanical Garden,
August 12, 1903.

The Government of Jamaica has decided to relinquish its use of the buildings at Cinchona. The experimental and botanical plantations are, however, to be maintained as before. The Surveyor General of Jamaica offered, under public advertisement on June 15, the group of buildings known as Bellevue and some land for rental. I have personally accepted this rental, for the purpose of saving the station for scientific purposes and with the plan of establishing there, if possible, the long desired American botanical laboratory in the American tropics. At my request, Dr. MacDougal has recently visited Jamaica to arrange details of the lease, and reports that the buildings and their furnishings are already comfortable and well adapted for the use of investigators.

Dr. MacDougal and I decided to take these steps after consultation and correspondence with Professor Underwood, who spent the early part of the year in Jamaica in the study of ferns, and who is now in Europe; with Dr. Duncan S. Johnson, who has recently returned from Jamaica, where he has been collecting material for embryological studies; with Mr. William R. Maxon, who was there with Professor Underwood during the spring, and with Professor Earle, who spent last November in Jamaica in mycological investigations. Dr. MacDougal was already familiar with the locality from his visit there with Professor Campbell in 1897, and we had discussed the topic with the Hon'ble William Fawcett, Director of Public Gardens and Plantations of Jamaica, while he was in New York last autumn during the meeting of the Plant Breeding Conference. The aid and co-operation of all, who regard the securing of Cinchona as a proper and desirable act, will be needed to maintain such a laboratory, and to this end I ask that you write me your opinions on this subject, and indicate what aid you can render, and whether either you or your students would wish to make use of the station during the next year, and if so, for what length of time approximately.

I may say that the Jamaica Government is heartily in sympathy with the enterprise and will co-operate to a very important extent, furnishing facilities for growing plants under the widely different climatic conditions offered by the gardens at Cinchona, Hope and Castleton, the use of the large botanical laboratory and herbarium at Hope and the use of visitors' tables in the laboratory at Hope.

As regards Cinchona, I quote the following from Professor Underwood's account of his work in Jamaica from the July issue of the *Journal of the New York Botanical Garden*:—

> Not the least important of the results of the expedition was a possible solution of the problem of a suitable location for a tropical laboratory, which has long been under consideration by American botanists. At the time of the visit of the committee, appointed some years ago to investigate the subject, the plant at Cinchona was occupied by the government botanist, and was consequently out of the question. A one-story, six-roomed house, three or four low buildings suitable for laboratory work, with two green houses, of sufficient capacity to conduct experimental work under glass, could be had of the Jamaica Government at a nominal rent. Cinchona is nearly a mile above the sea with a delightful climate (the extremes of temperature for the past twenty years being 45° F. and 79° F.), a delightful outlook, and as closely accessible to virgin forest as could be obtained. Within 3 miles, nearly on a level, is Morce's Gap, whose tropical conditions I have described above; close to Morce's Gap you make the ascent to John Crow Peak (6,000 feet) through a forest of tropical luxuriance. Below is Mabess River (3,000 feet) with similar, but lower-level, vegetation. At about the same distance from Cinchona (3 miles) is New Haven Gap (5,500 feet) with a similar, but higher-altitude, flora. Still higher altitudes are accessible at Portland Gap and Blue Mountain Peak at a distance of 8 or 10 miles.
>
> There are no human habitations above Cinchona, so that the Clyde River, which supplies it with water, is pure and without sources of contamination. A more healthful location could not be found in all the American tropics.

Briefly expressed, the above scheme offers the investigator residence, accommodation and laboratory facilities at Cinchona under the most pleasant and advantageous conditions, from which place he may quickly transfer his work to more pronounced tropical conditions at Hope in a dry climate, or to Castleton in an extremely humid locality. The marine flora is equally accessible.

The locality furnishes easy access to an immense number of species of plants, different from those available at any other similar institution; travelling and living expenses are very reasonable, and Jamaica may be reached at intervals of only a few days by the numerous steamers of the United Fruit Company.

Yours sincerely,
(Sgd.) N. L. BRITTON.

SOIL TEMPERATURE.

According to King, the colour of a soil, especially when dry, has a marked influence on the temperature, even at considerable depths. The darkest soil, whether black or brown, is usually more than a degree warmer than light coloured soils at 4 inches deep. The best soil temperature for the germination of corn (maize) is 93°. It will germinate in three days at a temperature of 65·3°, while it will require eleven days, when the temperature is as low as 51° F.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 287 of this volume.

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Agricultural News

VOL. II. SATURDAY, SEPTEMBER 26, 1903. No. 38.

NOTES AND COMMENTS.

Dominica Exports.

The West India Committee Circular, of August 31, gives tables relating to the imports and exports of Dominica. In regard to the exports, the total value for the year 1902 was £80,794, which is £13,902 more than for the previous year. This large increase is chiefly due to improvements in the lime and cacao industries.

The total value of the lime products exported was £45,337 in 1902 and £35,086 in 1901. Under this head are included exports in green and pickled limes, raw and concentrated lime juice and lime oils. There were 136,546 gallons of concentrated, and 263,915 gallons of raw, lime juice exported during 1902. The cacao industry appears to be in a very promising condition. The exports in this product reached, in 1902, 1,368,283 ℔. of the value of £5,622.

West Indian Rubber.

Reference has been made in the *Agricultural News*, Vol. II, p. 246 and p. 278, to samples of rubber, obtained from British Guiana and Dominica respectively, and forwarded by the Imperial Commissioner of Agriculture to New York for reports. Further reports have been received upon these two samples from Dr. Carl Otto Weber, of Manchester, a recognized authority on rubber. In the case of the British Guiana sample, Dr. Weber reports: 'The rubber is moderately dark in colour, of very good strength and elasticity, but contains a considerable quantity of small fragments of bark.' An analysis of the washed and dried rubber showed a remarkably small percentage of proteids, resinous matter and ash, which renders the sample practically equal to fine Para rubber.

The value of the sample is estimated at 3*s*. per ℔. Dr. Weber is of opinion that this rubber is derived from a species of *Hevea*, probably *H. guianensis*.

There can be little doubt that a successful rubber industry is a possibility of the future in British Guiana, and the efforts now being made, by his Excellency the Governor, to draw attention to it would appear to be fully justified.

Upon the Dominica sample, Dr. Weber reports: 'The sample submitted was almost entirely free from mechanical impurities, contains a mere trace of moisture only, is fairly firm, tough and highly elastic. The amount of resin, as shown by analysis, is unusually high for *Castilloa* rubber; also in this case I wish to point out that by the employment of a thoroughly rational method of coagulation, part at least of the resins could be eliminated and at the same time the colour would be vastly improved. The market value of this sample, in its present form would be from 2*s*. 10*d*. to 2*s*. 11*d*. per ℔.'

The Cultivation of Sunflowers.

In the *Agricultural News*, Vol. II, p. 184, notes were given on the cultivation of sunflowers and an account of some of the uses of the plant. *Indian Planting and Gardening*, of July 25, gives the results of experiments in sunflower cultivation at Bangalore. 6 ℔. of imported Russian seed were sown on 1 acre of first-class land, manured with town refuse. The crop was reaped about four months after planting. The plants grew to a height of 7 to 8 feet and bore one large head. Six heads were measured and weighed, and it was found that they averaged 28⅓ inches in circumference and 1½ ℔. in weight. The average number of seeds per head was 1,286.

Agricultural Progress in British Honduras.

From the Annual Report of the Acting Governor of British Honduras (the Hon'ble P. C. Cork), it is evident that considerable efforts are being made to improve the agriculture of the colony. Mention is made of the inauguration of a Society of Agriculture and Commerce for the purpose of discussing agricultural and commercial matters, and of awakening interest in these subjects. A journal has also been started in connexion with this society. The services of the Superintendent of the Botanic Station have been placed at the disposal of any ten planters or cultivators of the soil, who make application for them, for the purposes of instruction and demonstration. Two small nurseries for the growth and distribution of economic plants have been started, and these it is hoped to develop gradually, as the agricultural interests increase. The report says: 'There are gratifying indications that these measures are appreciated by the small landholders especially, and every anticipation that they will be instrumental in increasing the general prosperity.'

Gold Coast Botanical Department.

We have received the *Report of the Botanical Department of the Gold Coast* for the year 1902. The report gives an account of the various experiments with economic plants, including West African rubber, tobacco, cotton, cacao, etc. The sum of £66 5*s*. 8*d*. was realized by the sale of plants, seeds and fruits; 26,000 plants and 748 packets of seeds were sold and distributed during the year.

It is reported that, as an experiment, to see if animals would live and thrive at Aburi, a mule was purchased from the Canary Islands. So far this animal has remained in good condition.

The total rainfall at Aburi for the year was 42·31 inches, of which 7·6 inches fell in October.

With reference to cacao cultivation, the Acting Curator writes: 'It is very encouraging to note that the natives are still increasing their plantations. A large number of pods were sold during the year for this purpose.' In the last issue of the *Agricultural News*, Vol. II, p. 297, we gave figures to show the increase in the export of cacao from the Gold Coast during the last few years.

The Cultivation of Sisal in Hawaii.

The Hawaii Agricultural Experiment Station has recently issued a bulletin, entitled *The Cultivation of Sisal in Hawaii*, by F. E. Conter.

The first part of the paper deals with the history, botany and geographical distribution of sisal.

With regard to the cultivation of sisal, it is stated that the plant will grow in any soil and at any elevation in tropical or sub-tropical countries, provided there is sufficient drainage. The largest yields and the best fibre are obtained on a broken and porous limestone or coral soil in a warm moist climate, subject only to moderate changes. The plant is propagated by shoots or suckers, which are planted in nursery beds at a distance of 9 inches by 18 inches. At twelve months, the plants should be about 18 inches high, when they may be transplanted into the field. The distance at which the plants are set in the field varies from 7 feet by 7 feet to 9 feet by 8 feet, according to the character of the land. These distances give from 600 to 900 plants to the acre. Weeds and bush have to be kept down while the plants are small, though cultivation becomes very difficult when the plants grow old and cover the ground. The flowering scape (or pole) upon reaching a height of 4 feet must be cut off just above the base of the upper leaves. In harvesting the crop, the mature leaves are cut close to the stalk with a large pruning knife, and carried in trucks to the mill.

After passing through the mill, the fibre is hung out to dry in the sun and afterwards spread on the raised wooden floor of an open shed for a few days.

A sisal plant at time of poling has about 235 leaves, of which 185 are mature or nearly so, while 50 leaves will mature within one year. The first cutting of leaves takes place at three years after planting and averages 25 mature leaves per plant. Subsequent cuttings may be made at intervals of six months. The yield of fibre is, as a general rule, about 50 ℔. from every 1,000 leaves, the total yearly yield being about 1,200 ℔. per acre.

In 1900, the United States imported 75,241 tons of sisal hemp from Mexico and 1,680 tons from other countries, a total of 76,921 tons, valued at $11,782,263. Raw sisal fibre was quoted in the New York market, in August 1902, at 10c. per ℔. Hawaiian grown fibre sold in San Francisco, in February 1903, for 8c. per ℔. The outlook for the future of this industry in Hawaii is therefore very good.

Rubber in Brazil.

The following account of rubber in Brazil is translated from the *Botanisches Centralblatt*, Vol. xciii, p. 158. This is an abstract of an article by Herr August Kähler, entitled 'Die Gewinnung von Feingummi und Kautschuk in Brasilien,' that appeared in Dr. A. Petermann's *Mittheilungen*, 1903. The author stayed for five years in the region of the Amazon tributaries, where he studied the methods of obtaining rubber in use there:—

The rubber is known in Brazil as 'borracha' or 'seringa,' but in trade as fine Para. A plantation of seventy to one hundred *Siphonia elastica* trees is known as an 'estrada.' Each planter (or 'seringueiro') possesses two of these, which he works alternately. The workman cuts with a very small hatchet, the cutting edge of which measures 1 to 1½ inches, four to ten small holes in the bark of the tree, reaching down to the wood. Under each cut he places a small tin bowl, the sharp edge of which easily penetrates into the bark, and so remains fixed. This cup catches the milk which flows from the opening. The sap is sweetish and resembles milk. The holes in the stem close, naturally, in two hours, so that there is no overflow from the cup. The contents of the cups are, about mid-day, emptied into a larger tin vessel. In the afternoon, the process of smoking is begun in the hut. The smoke is provided by the hard fruit of a palm, known as 'shevon.' When the smoke is clean, the 'seringueiro' holds in it a stick or wooden pole covered with the white sap; after fifteen seconds this becomes yellow and solid. On this first layer follows a second, and so on. In the course of a day a fairly large ball is obtained. Sometimes a ball weighing 110 ℔. and 20 inches in diameter is so produced. Such a heavy ball can, naturally, only be held in the smoke with the aid of a lever. The sap may also be smoked on a small wooden shovel. In this way are produced small discs ('pracuchas') weighing 4½ ℔., which, on account of the smaller number of blisters, are valued higher than the balls. In six months, one man may obtain as much as 2,200 ℔. of rubber. The cost of 1 ℔. of rubber in Europe is about 3*s*. 4*d*.; the demand is greater than the supply. A good substitute has, hitherto, not been discovered. From the residue, sticking to the vessels, an inferior kind of rubber is obtained known as 'sernamby de seringa,' or 'sernamby de borracha.' After four or five years the *Siphonia elastica* requires one year's rest, in which to recuperate. The trees in rubber plantations first yield milk at the age of twenty-two years, sometimes earlier.

INSECT NOTES.

An Insect Pest of Sweet Potatos.

The *Bulletin of the Department of Agriculture, Jamaica*, for August, refers to the attacks on sweet potatos of a grub, which renders the root unfit for food purposes, on account of the holes made through it. The following description is given:—

> The grub is small, whitish and maggot-like, about ¼ inch long. It has no feet, but is able to bore its way through the potato. The portions of the potato next to the borings become black and discoloured, and even the untouched parts are said to be without taste and to be refused by pigs. The grub is the larva of the sweet potato weevil, which is one of the snout beetles, about ¼ inch long, of a bluish-black colour, brownish in the middle, with long, blackish snout or beak. It is known to entomologists as *Cylas formicarius.*
>
> As the infested potatos are useless for food, there need be no hesitation about burning them at once, as well as all the rubbish on the ground, which may harbour more of the insects. Destruction by fire prevents the multiplication of the insects, and future attacks may be less severe.
>
> In order to give no opportunity for later development of these pests, it is well to plant the ground with some other crop, such as corn or cane, which is not affected by the maggot.

This note from Jamaica is of special interest because, in some of the other islands, there is an insect very similar to the one here described. It also produces the same effect on the potatos though known under a different name. It was described from Barbados in 1849, and still does much damage from time to time. In this island it is known locally under the name of 'Scaribee,' while in St. Kitt's-Nevis and Antigua it is called 'Jacobs.'

Reference to its occurrence in the northern islands will be found in the *Agricultural News*, Vol. II, pp. 200, 216.

Wild Bees.

Reference has already been made in these columns in a general way to the cow bees, wild bees and mason bees, (Vol. I, p. 200; Vol. II, pp. 24 and 42), and the indefinite nature of the names and the habits of the insects has been pointed out. It is now possible to record some observations on one of these, the so-called wild bee of Barbados, which probably also occurs in some of the other islands.

These three insects, commonly called bees are really wasps, the mason bee belonging to the genus *Pelopœus*, and the other two being closely allied species in the genus *Polistes.*

In a field of Woolly Pyrol in Barbados, which was badly attacked by caterpillars, wild bees were seen to be very plentiful. These were carefully watched and one was found on a leaf eating a caterpillar. Several others were noticed doing the same thing in this field, and later they were seen in the cotton fields attacking the cotton worm, which feeds on the leaf of the cotton. One wild bee was observed on a plant of Peruvian corn attempting to capture some small flies which were then abundant. Remaining perfectly motionless till a fly appeared, the bee made a sudden lunge, apparently trying to capture the fly with its fore legs and mandibles. The fly was too quick and escaped, and though several attempts were made none were successful.

It may be necessary to destroy the nests of these insects when they are in such places that there is danger of persons coming in contact with them and being stung, but as a general rule they will not interfere with any one unless they are, and since they are known to be positively beneficial in their feeding habits, they should not be indiscriminately destroyed.

EXPERIMENTS WITH SWEET POTATOS.

The Jamaica *Gleaner*, of September 2, contains a report by Mr. Palache, Agricultural Supervisor at the Prison Farm, of the results of experiments in sweet potato cultivation conducted at the Farm. Experiments were made with nine varieties, the area planted out in each being 1/75 acre. The best variety was that known as Tom Parson Prince, which, Mr. Palache states, was introduced into Jamaica early in the forties from Barbados by a minister named Prince. The yield with this variety was at the rate of 14½ tons per acre.

A large number of slips of these potatos have been distributed to small cultivators for the purpose of re-stocking grounds devastated by the hurricane.

The following table gives particulars of the varieties:—

Variety.	*Months to mature.*	*Actual returns.*	*Ratio per acre.*		
		lb.	tons.	cwt.	lb.
1. Tom Parson Prince	7	435	14	11	35
2. Round Red	5	355	11	15	5
3. Mother Bartley	6	305	10	4	27
4. Porus Pigeon Neck	6	300	10	0	4
5. Yellow Covey	9	296	9	18	24
6. Josephs	9	260	8	14	12
7. Black Parson Prince	6	225	8	8	59
8. Costa Rica	6	212	7	2	16
9. Jane Dennis	7	171	5	17	46

REMARKS.

1. Finest cooking quality, hardy and vigorous grower.
2. Very hardy, thrives in poor land, quickest bearer.
3. Vigorous grower, stiff stems, purple centre in tuber.
4. Hardy stiff stems, does not run much, fine potato.
5. Vigorous runner, large vine, heavy leaves, large tubers yellow as a pumpkin.
6. Great runner, large leaves, short stem, long mealy potato.
7. Very hardy, purple stem and leaf, purple centre in tuber, does not run.
8. Hardy and grows in the poorest land, tubers small.
9. Good vigorous runner. Prolific bearer and unequalled in flavour and quality.

DEPARTMENTAL REPORTS

GRENADA: ANNUAL REPORT ON THE BOTANIC STATION, EXPERIMENT PLOTS AND AGRICULTURAL EDUCATION, 1902-3.

Botanic Station: The report deals with the working of the Station during the year ended March 31, 1903.

The economic plants already established appear to continue in a satisfactory condition. There was an increase in the number of economic and ornamental plants distributed from the Station, the total number for the year being 9,432, exclusive of 96 packages of seed. The report indicates that the Curator is making an earnest endeavour to carry on the work in a satisfactory manner.

Cacao Experiment Plots: The report of the Agricultural Instructor upon the five cacao experiment plots in the country districts shows that very satisfactory results are being obtained. From a plot, an acre in extent at Niangan-foix, 3,989 ℔. of wet cacao were obtained during the year ended September 30, 1902; at Bellevue the yield was 2,087 ℔. per acre.

Agricultural Education: As appendices are published, memoranda and circulars relating to the establishment of school gardens in Grenada, and reports on the recent course of lectures to teachers delivered by Mr. L. Lewton-Brain. Considerable interest was taken in the lectures which were attended by twenty-three teachers.

From these memoranda and reports it will be seen that an earnest endeavour is being made in Grenada to place the teaching of agriculture upon a sound footing. The suggestions made by the Imperial Commissioner of Agriculture, in reference to the laying out of school gardens, should be useful to Managers and Teachers, who will also have the opportunity of obtaining advice from the Agricultural Instructor.

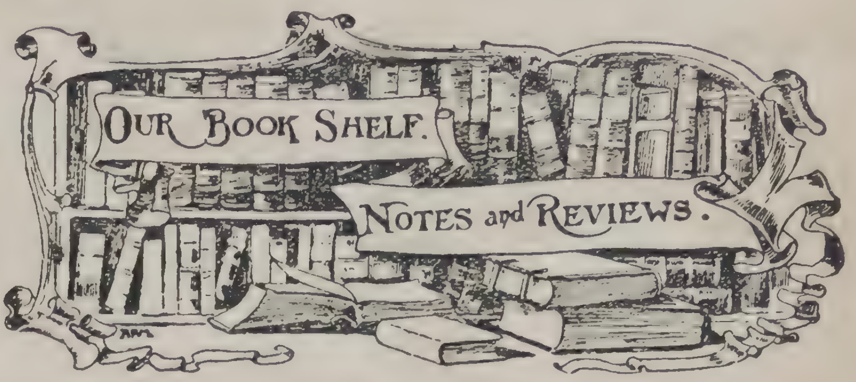
MONTSERRAT: ANNUAL REPORT ON THE BOTANIC STATION AND EXPERIMENT PLOTS, 1902-3.

Botanic Station: The report deals with the work performed by Mr. Jordan, the Agricultural Instructor, during the year ended March 31 last. The expenditure for the year, provided from the funds of the Imperial Department of Agriculture, amounted to £617 12*s.* A fountain was erected at the Grove Station, the cost being defrayed from local funds. Economic and other plants to the number of 19,757 were distributed during the year.

Excellent results were obtained from the experiment plots of onions, cotton, ginger and pine-apples.

In reviewing the report, the Imperial Commissioner of Agriculture writes: 'The report throughout is of a satisfactory character and it bears evidence that Mr. Jordan is strenuous in his efforts to improve the agricultural resources of the island.'

Agricultural Instruction: The report of the Local Instructor gives an account of the visits made by him, to the country districts. The Instructor held meetings in several localities and gave demonstrations.


OUR BOOK SHELF.
NOTES and REVIEWS.

PHYSICS OF AGRICULTURE. By F. H. King. *Madison, Wis.: Published by the author, 1901.*

This excellent text-book, written by the Professor of Agricultural Physics in the University of Wisconsin, is deserving of a place in all agricultural libraries.

As indicated in the preface, the book is written for the farmer in order that he may be brought to understand the fundamental principles upon which successful agriculture is based. These principles are here presented rather from the physical standpoint than that of chemistry or of biology.

The Physics of Agriculture are dealt with in five sections, viz: physics of the soil; ground water, wells and farm drainage; principles of rural architecture; farm mechanics, and the principles of weather fore-casting. It will be seen that most important subjects, covering a very wide range, are included in this list.

Considerable prominence is given to the subject of soil texture. The object, method and implements of tillage are dealt with in a complete and careful manner, and stress is laid upon the importance of cultivation as a means of controlling soil moisture and influencing soil ventilation. The section on farm mechanics which covers most of the ground usually found under the head of agricultural engineering, will be found to be full of most useful information, especially those parts dealing with the principles of draft, farm motors, machinery and wind mills.

The book is nicely got up, and the 276 illustrations which it contains, will assist the reader to obtain a clear understanding of the subject.

AGRICULTURAL SOCIETY.

Antigua.

A meeting of the Antigua Agricultural and Commercial Society was held on September 4, and was largely attended. We are indebted to the Honorary Secretary (Mr. W. N. Sands) for the following report of the proceedings:—

The chairman (the Hon'ble T. F. Foote) stated that before proceeding with the business of the meeting, he wished to take the opportunity of welcoming back to Antigua the Hon'ble F. Watts. Mr. Watts had been to England on a mission of great importance. He hoped that the result of his labours would soon be seen in the erection of a Central Sugar Factory.

The Rev. J. MacConnie also extended, on behalf of the Society, a welcome to Mr. Sands. Mr. Watts and Mr. Sands replied, thanking the members for their welcome.

Among subjects discussed at the meeting may be mentioned the distribution of cotton seed and the requirements of Antigua in connexion with mail and passenger traffic with Great Britain and Canada.

GLEANINGS.

The *St. Lucia Gazette*, of August 21, contains a notice to the effect that fresh onion seed (red and white varieties) from Teneriffe is available for distribution. The public are also notified that budded orange plants of good varieties are available for sale.

The Transvaal Colonial Government has been advised that for restocking purposes it is desirable to obtain stock from tick-infested countries, as experience has shown that they are less liable to, and better able to resist, the epidemic diseases of cattle in South Africa than cattle from England.

According to the *Board of Trade Journal* of August 27, the Consul General at Frankfort remarks in his recent report that there has been a decline during the last few years in the amount of indigo imported into Germany. Indigo is chiefly imported from British India.

According to the *Maritime Merchant* of August 13, there has been a large decrease in the amount of molasses shipped from Barbados to Canada during 1903. In consequence of this there will be the greatest scarcity of molasses this year that Canada has ever experienced.

The St. Thomas *Tidende* of September 5, states that the Agricultural and Industrial Society had received a supply of fresh Sea Island cotton seed from Barbados, which would be distributed free to small cultivators in St. Thomas and St. John.

From the Curator of the St. Vincent Botanic Station we learn that 60 ℔. of honey were shipped in May last to Mr. J. W. Hill, of Huddersfield, who offered to pay at the rate of 50*s.* per cwt. for a sample of liquid honey. In reporting upon the sample, Mr. Hill points out that there is good honey from Jamaica selling at 2*s.* to 2*s.* 6*d.* per gallon, with which St. Vincent honey would have to compete.

The most important feature of the lumber trade of British Honduras during 1902 has been the increase of exports to the United States of mahogany and cedar. Whereas logs of these woods have to be squared for the British market, they are shipped in their natural state to the United States, and the cost of squaring is saved to the vendor. (*Board of Trade Journal*, August 27).

The Acting Agricultural Instructor at Grenada writes: 'At Plaisance estate in St. John's parish, there are about a dozen trees of Marigohype coffee. The trees, which were nipped back at a height of 3 to 5 feet, are about five years old. They are at present laden with berries, which are elongated and much larger than the fruits of Arabian coffee though not as large as those of Liberian coffee.

According to *Indian Planting and Gardening*, the juice of the green pine-apple is accredited in Java, the Philippines and throughout the Far East, generally, with being a blood poison of a most deadly nature. *Health* mentions it as the substance with which the Malays poison their kreeses and daggers.

Cable advices report that within the past week the remainder of the Demerara sugar crop, amounting to 6,000 tons, has been sold to go to Montreal. Almost the entire Demerara crop has this year been marketed in Canada instead of the United States. (*Maritime Merchant*, August 23).

In the Southern States, the second crop of Irish potatos is often grown under straw. The whole tubers are planted just below the soil, and one foot or less of straw, pine needles or some such material is put on. The haulm grows through the mulch, and the new tubers are found above the surface of the soil. (*Practical Farmer*, Philadelphia).

According to the report of the Colonial Secretary of Bermuda for the past year, agriculture is not as successful as it might be in that colony, but the farmers are more alive to the importance of improving the quality of their produce. The exports consisted chiefly of onions, potatos and lilies, and were valued at £111,135. Over 80 per cent. of the exports went to the United States.

Our Western Empire, of August 15, states: 'One of the many ways in which Canada may benefit the West Indies to her own advantage is by encouraging the use of molascuit as a cattle food. It has been freely adopted in Great Britain with the most promising results, especially by the Scotch farmers who always seem to bring the most intelligent criticism to bear on agricultural improvements.'

Mr. John Belling, B.Sc., Agricultural and Science Master, St. Kitt's, writes: 'Some young grape vines from California looking sickly, I examined their roots and found galls full of living Phylloxera. These had presumably survived a fumigation with hydrocyanic acid before being exported. As a remedy the pots were immersed in water for forty-eight hours at a time. This points to the need for inspection and fumigation at the point of entry.'

At the British Pharmaceutical Conference at Bristol, Mr. E. M. Holmes, in his instructive paper on 'Agricultural and Horticultural Insecticides,' suggested that more attention might be paid by British gardeners to the cultivation of the lady-bird. By a curious coincidence, the same suggestion was made by a correspondent in the *Gardeners' Chronicle* for August 1, who pointed out that a number of lady-birds had been sent to the United States in order to deal with insect pests. (*Pharmaceutical Journal*, August 15).

Mr. William Smith, Acting Agricultural Instructor, Grenada, writes:—'The planters in this island, except in the parish of St. Patrick, are recognizing the value of artificial manures and of 'bedding' in the cacao fields. In St. Patrick, however, the soil is very fertile and the estates have been giving good yields without the use of manures, and consequently, manures are considered unnecessary. That this is a great mistake is shown by what has happened in the Grand Roy and Concord districts, where, five or six years ago, the yield on unmanured land was five bags per acre, while now no more than two bags can be obtained.'

EDUCATIONAL.

The Teaching of Agriculture in Elementary Schools.

We take from the Demerara *Daily Chronicle*, of September 9, the following extract, relating to Agricultural teaching, from an address by Mr. C. T. Holder, at a Conference of Teachers and Managers, held at Georgetown on August 26:—

> That this subject found a place within the curriculum laid down by the present system, was something to be thankful for, but it was at present an extra subject, with which many schools may never be bothered, there being nothing to compel the teaching of it. But further, being an extra, no matter how well up in the subject the scholars may be, the conversion of this knowledge into monetary value for the teacher depended upon other things. Because a child was unable to solve Chinese puzzles under the heading of arithmetic, or to write an essay on the organ or some similar easy subject, there was no grant for the intimate knowledge he may display on the subject of agriculture. What encouragement then was there for the teacher to devote his time and energy to this subject, which was the one most required if they would have a thriving peasantry, when it was borne in mind that his bread and butter, his very existence, depended on the individual results of his scholars? No better object-lesson could be afforded them than one recently given, wherein a certain teacher, well known for the zeal with which he entered into the Government scheme, threw heart and soul into the matter of agriculture, and the result was that at the recent examination of his school five-eighths of his grant were lost. Let the Government have less of specialization at the annual examination, let them so simplify the examinations that, having no fears as to the result of his labours at the end of the year, the teacher may be in a position to give some time to the teaching of object-lessons and the introduction into his time-table of nature-study; but so long as the system remained as it was at present, they could not conclude otherwise than that matters educational in this colony did not tend to the promotion of a healthy peasantry.

It must be admitted that there is a certain amount of reason for this complaint. Nor is this feeling confined to British Guiana. We are constantly hearing similar complaints from other West Indian colonies. If the teaching of agriculture in the elementary schools of these colonies is to be made a success, there must be a thorough and complete change in the educational system to meet the special requirements in connexion with agriculture.

How to Teach Physical Geography.

The following extract from the Right Hon. James Bryce's paper on 'The Importance of Geography in Education,' appearing in the *Geographical Journal* for March 1902, indicates a correct method of teaching Physical Geography, which might be adopted with advantage in some West Indian schools and colleges:—

> He must be taught, whenever he is shown a fact in physical geography, to inquire into the cause, and whenever they are two facts, to ask what relation, if any, there is between them. What connexion, for instance, is there between the inclination of the hills, whether gentle or steep, in a mountainous district and the character of the rocks and the amount of rainfall in that district? What connexion is there between the growth of trees and the rainfall and prevalent winds? In that way physical geography will teach the pupil to acquire the habit of looking at a region as a whole, so that when there is any district which he has got to know by his own observation, he will begin to reflect and seek to discover what have been the physical causes, which have gone to make this district what it is, and what relation exists between those various causes.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture for the West Indies left for the United States in S.S. *Tennyson* on Friday, September 18. During the absence of Sir Daniel Morris, Professor d'Albuquerque will sign on behalf of the Commissioner of Agriculture until further notice.

Mr. J. R. Bovell, F.L.S., F.C.S., also left in S.S. *Tennyson*, for the United States. Mr. Bovell will accompany Sir Daniel Morris on his visit to the Sea Island cotton districts.

It is contemplated that Mr. L. Lewton-Brain, B.A., F.L.S., Mycologist and Lecturer in Agriculture on the staff of the Imperial Department of Agriculture, will make an official visit to the Agricultural School at St. Vincent from September 29 to October 3, the Agricultural School at St. Lucia on October 7, and the Agricultural School at Dominica on October 8.

AGRICULTURAL SHOWS.

St. Vincent.

The St. Vincent *Times*, of September 3, has the following reference to the proposed Agricultural Show:—

> A meeting of the Agricultural Show Committee, presided over by his Honour the Administrator, was held yesterday for the purpose of making a list of exhibits for the forthcoming Agricultural Show. After some discussion, the meeting adopted the suggestion of the Imperial Commissioner of Agriculture to hold the Show some time in March next. A proposed list of exhibits was drafted.

Demerara.

An Agricultural and Live Stock Show will be held at Georgetown on November 5 and 6.

The following prizes have been offered by his Excellency the Governor:—

1. A prize of $50 for the best sample, not less than 10 lb. in weight, of well-cured vanilla.
2. A prize of $10 for the best sample, not less than 10 lb. in weight, of the Brazil nut of commerce.
3. A prize of $50 for the best collection of good merchantable, clean Para rubber, in quantity exceeding 1 cwt.

SOIL MANAGEMENT.

A division of soil management has recently been instituted in the United States Department of Agriculture, with the object of investigating the questions which present themselves in the development of the soil survey, as to the possibility of improved methods of cultivation and handling of crops, as well as of introducing new methods, new crops and new industries. The following extracts from the Report (No. 73) of the Secretary of Agriculture, indicate the nature and results of the important investigations so far carried out by the division:—

In the development of the soil survey, many questions are presented of the possibility of improved methods of cultivation and handling of the crops, as well as of introducing new methods, new crops and new industries. Some of these suggestions need more time and more study than can be given by the soil-survey parties in the limited time for which they remain in an area. Furthermore, the presentation of such suggestions in printed reports is apt to fail of securing proper recognition from the conservative farmer, who follows pretty much the methods used by himself and his predecessors on the land. Without these further studies and a practical demonstration of their efficiency, many of the important results of the soil survey are liable to be lost.

For these reasons, a division of soil management has been instituted in the Bureau, in charge of Professor Franklin H. King. During the past year exceedingly delicate methods have been devised for the analyses of soils in the field. They are so sensitive, that the amounts of nitrates, phosphates, sulphates and the like, which may be present, as indicated by water solutions, can be determined to within 4 ℔. or 5 ℔. per acre, 1 foot deep. With these methods it is possible to detect, throughout the year, fertilizers which were applied in the spring, and to trace the movement of these fertilizers from the place, where they were applied, down through the different depths of the soil. It has been found possible to show noticeable differences in the chemical composition of the soil in the same field, in some parts of which the crops are growing well, and in other parts of which they are but poorly developed. It appears that the time has arrived, looked forward to with much interest by scientists and practical men alike, when an analysis will show the need of any particular soil for certain fertilizers. It is too early to make a positive statement of this kind, but the indications are that this can soon be accomplished.

The results of this work have led us to look upon the soil moisture as a great nutritive solution existing over the surface of the earth, the composition of which is everywhere approximately the same. The soil is a heterogeneous mixture of minerals, the predominate ones being silica, felspar, mica, and other like silicates, resulting primarily from the disintegration and decomposition of igneous rocks, spread out often through the action of water over vast areas of land. All these minerals are but slightly soluble, and it is not unreasonable to expect, that such a heterogeneous mixture of silicates in contact with water should yield a soil solution having sensibly the same composition and concentration. The older experimenters in Germany found that in making up solutions for water culture, or for sand culture, the concentration and composition of the nutritive solution must be the same, within relatively narrow limits, for success in plant development. The results of the past season indicate that the differences in the composition and concentration of the dissolved material in the soil mixture of various types of soil of widely different localities and of different agricultural values are little, if any, greater than the differences to be found in one and the same type of soil under good and under poor farm management. . . . . . .

This work will require much further investigation before these statements can be definitely proved, but the amount and character of the evidence so far obtained is such, that these ideas may be taken safely as working hypotheses. They are now serving us in this capacity in suggesting and giving direction to studies, which are confidently believed to have far reaching importance for agricultural methods and practice, studies which in all probability could not have been conceived, or planned, without the investigations which have just been briefly outlined. The results of the work indicate, as might be expected, that the composition of the soil moisture is largely influenced both by the cultivation and by the cropping of the soil, and appear to show in what way and to what extent cultivation can be depended upon to change these important characteristics.

THE DESTRUCTION OF HERONS AND IBISES.

We have received copies of petitions against the destruction of white herons and red ibises, presented to the Governor of the State of Pará by Dr. Emil Goeldi, C.M.Z.S., Director of the Pará Museum of Natural History and Ethnography, The following extracts relating to Heron farming and the measures recommended for the protection of these birds will explain Dr. Goeldi's position:—

Heron plumes, which are now frequently seen on ladies' hats, come second in value to those of the ostrich. They are chiefly obtained from the female bird at the breeding season. The precious adornment, however, is becoming rarer and rarer, for the flocks of herons are being decimated by indiscriminate slaughter. At present, the principal country that produces heron plumes is Venezuela, whence not less than 1,300 ℔. of feathers are exported to Paris, and represent a value of £125,000.

A more beautiful creature than one of these adult herons, adorned with its nuptial veil of dazzling whiteness can scarcely be imagined. And it is this ornament of creation that stands in jeopardy. There are men, who, every year, order a wholesale slaughter of both sexes, old and young leaving the carcasses to rot on the spot.

I do not desire to proclaim a supposed and theoretical utility that predominates in herons. Everybody knows that they devour innumerable river and lake animals, both living and dead, and, without doubt, produce a beneficial effect in cleansing the adjacent lands

I recommend, as the means that to me seem most salutary, the following measures: First, the absolute prohibition of hunting herons and ibises from June 1 to January 31. Second, the recommendation of nesting-places on private property to the especial protection of the owners, and the rendering of those on public lands inviolable. Third, the laying of prohibitive duties on the feathers of herons, and ibises, both on those issuing from Pará and on those in transit.

MARKET REPORTS.

London,—September 1, 1903.—Messrs. Hales Caird & Co., Messrs. E. A. de Pass & Co., Messrs. Kearton, Piper & Co.; 'The West India Committee Circular,' August 31; and 'The Public Ledger,' August 29, 1903.

Aloes—Curaçoa, 14/- to 28/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 1¾*d.* to 4*d.* per ℔. Bermuda, 1/3 to 1/6 per ℔.
Balata—1/11½ to 2/6 per ℔.
Bees'-wax—£7 10*s.* to £7 17*s.* 6*d.* per cwt.
Cacao—Trinidad, 58/- to 67/- per cwt.; Jamaica, 48/6 to 56/- per cwt.; Grenada, 50/- to 59/6 per cwt.; Dominica, 48/- to 56/- per cwt.; St. Lucia, 49/- to 56/- per cwt.; Demerara, 57/- to 60/- per cwt.
Cardamoms—Mysore, 1/4 to 3/- per ℔.
Coffee—Jamaica, 32/- to 120/- per cwt.
Cotton—West Indian, 6*d.* to 6¾*d.* per ℔.
Fruit—
  Bananas—7/- to 8/- per bunch.
  Oranges—Jamaica, 9/- to 12/- per case.
  Pines—Antiguas, 10/6 to 15/- per barrel; Jamaicas, no quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 38/6 to 68/- per cwt.
Honey—Jamaica, 16/ to 25/ per cwt.
Isinglass—West Indian lump, 2/3 to 2/11; cake, 1/4 to 1/6 per ℔.
Kola Nuts—4*d.* to 7*d.* per ℔.
Lime Juice—Raw, 10*d.* to 1/3 per gallon; Concentrated, £13 10*s.* to £16 per pipe. Distilled Oil, 1/6; Hand Pressed, 2/9 to 3/- per ℔.
Logwood—Jamaica, £4 to £4 12*s.* 6*d.*; Honduras, £5 10*s.* to £6 15*s.* per ton.
Mace—1/10 to 2/4 per ℔.
Nitrate of Soda—Agricultural, £9 12*s.* 6*d.* per ton.
Nutmegs—70's to 75's, 1/8 to 1/10; 80's to 90's, 1/2 to 1/6 per ℔.
Pimento—3*d.* to 3⅛*d.* per ℔.
Rum—Demerara, 9½*d.* to 10*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—Jamaica, 1/- to 1/2; Honduras, 11½*d.* to 1/4 per ℔.
Sugar—Muscovado, 11/- to 14/-; Crystallized, 15/3 to 16/6 per cwt., Molasses, 11/- to 14/- per cwt.
Sulphate of Ammonia—£12 5*s.* to £12 6*s.* 3*d.* per ton.
Tamarinds—7/6 to 8/- per cwt.

Halifax, N.S.,—August 27, 1903.—'The Maritime Merchant.'

Bananas,—$2·00 to $2·25 per bunch.
Ginger—Jamaica, 24c. pure bulk.
Hay—$12·00 to $14·00 per ton.
Molasses,—Porto Rico, 43c. to 44c.; Barbados, 39c. to 40c.; Antigua, 33c. to 35c.; Trinidad, 44c. to 45c.
Nutmegs—50c. to 60c.
Oranges,—Jamaica, $7·00 per barrel.
Pine-apples—$1·50 to $2·25 per dozen.
Potatos—New, 50c. to 60c. per bushel.

St. John, N.B.,—August 27, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 42c. to 44c.; Barbados, 37c. to 40c. per gallon.

New York,—August 21, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, $1·30; eight hands 95c.; seven hands, 65c. per bunch.
Cacao—African, 11¾c. to 12c.; Caracas, 12¾c. to 13½c.; Jamaica, 9¾c.; Grenada, 12c. to 12¼c.; Trinidad, 12c. to 13¼c. per ℔.
Cocoa-nuts—Trinidads, $25·00 to $26·00; Jamaicas, $25·00 to $27·00 per M.
Coffee—Jamaica, fair to good ordinary, 5c. to 5½c. per ℔.; Manchester grades, 7½c. to 9½c. per ℔.
Ginger—Jamaica, 7½c. to 8¼c. per ℔.
Goat Skins—Jamaicas, 50c. to 53½c. per ℔.
Pimento—6c. to 6½c. per ℔.
Rubber—Nicaragua scrap, 71c. to 71½c.; Guayaquil strip, 64c. per ℔.
Sugar—Muscovados, 89°, $3\frac{5}{16}$c.; Centrifugals, 96°, $3\frac{13}{16}$c.; Molasses, 89°, $3\frac{3}{16}$c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—September 12, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·75 per 100 ℔.
Cacao—$14·00 per 100 ℔.
Cocoa-nuts—$15·00 per M. (Husked nuts).
Coffee—Jamaica, $7·50 to $8·50; ordinary Rio, $9·00 per 100 ℔.
Hay—New Brunswick, 80c. to $1·00 per 100 ℔.
Manures—Nitrate of soda, $57·00 to $65·00; Ohlendorff's Dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00 per ton.
Molasses—No quotations.
Onions—Madeira, $2·00 to $3·00 per 100 ℔.
Potatos, English—$4·00 to $4·17 per 160 ℔.
Rice—Ballam, $4·84½ per bag (190 ℔.); Patna $3·50 per 100 ℔.; Rangoon, $2·60 to $2·80 per 100 ℔.
Sugar—In hogsheads, $1·50 per 100 ℔., and $5·00 for hhd. In bags, $1·75 per 100 ℔.

British Guiana,—September 10, 1903.—Messrs. Weiting & Richter.

Arrowroot—St Vincent, $9·50 per barrel.
Balata—40c. to 42c. per ℔.
Cacao—Native, 11c. to 12c. per ℔.
Cassava—$1·00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 10½c. to 11c. per ℔. (retail); —Creole, 10c. to 11c. per ℔.
Dhal—$3·10 to $3·20 per bag of 168 ℔.
Eddoes—$1·44 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon, casks included.
Onions—2¼c. to 3c. per ℔.
Pea Nuts—Curaçoa, 3¾c.; American, 5c. per ℔. (retail).
Plantains—20c. to 40c. per bunch.
Potatos, English—$3·25 to $3·50 per barrel.
Rice—Ballam, $4·60 to $4·65 ex store; Patna and Seeta, $5·65 per bag. —Creole Rice, 20c. to 22c. per gallon (retail).
Sweet Potatos—Barbados, 96c. per barrel.
Tannias—$2·16 per bag.
Yams—White, $2·40 per bag.
Sugar—Dark Crystals, $2·00; Yellow, $2·20 to $2·30; Molasses, $1·70 to $1·90 per 100 ℔.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—September 10, 1903.—Messrs. Gordon Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Venezuelan, 42c. per ℔.
Cacao—Ordinary, $12·75 to $13·00; Estates, $13·25 to $14·00 per fanega.
Cocoa-nuts—America, $14·00 to $16·00 per 1,000 ℔.
Coffee—5c. to 6c. per ℔.
Copra—$2·25 to $2·35 per 100 ℔.
Onions—$1·75 to $2·50 per 100 ℔.
Potatos, English—$1·70 to $1·80 per 100 ℔.
Rice—Yellow, $4·25 to $4·65; White Table, $5·50 to $5·80 per bag.
Sugar—No quotations.

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[46.]

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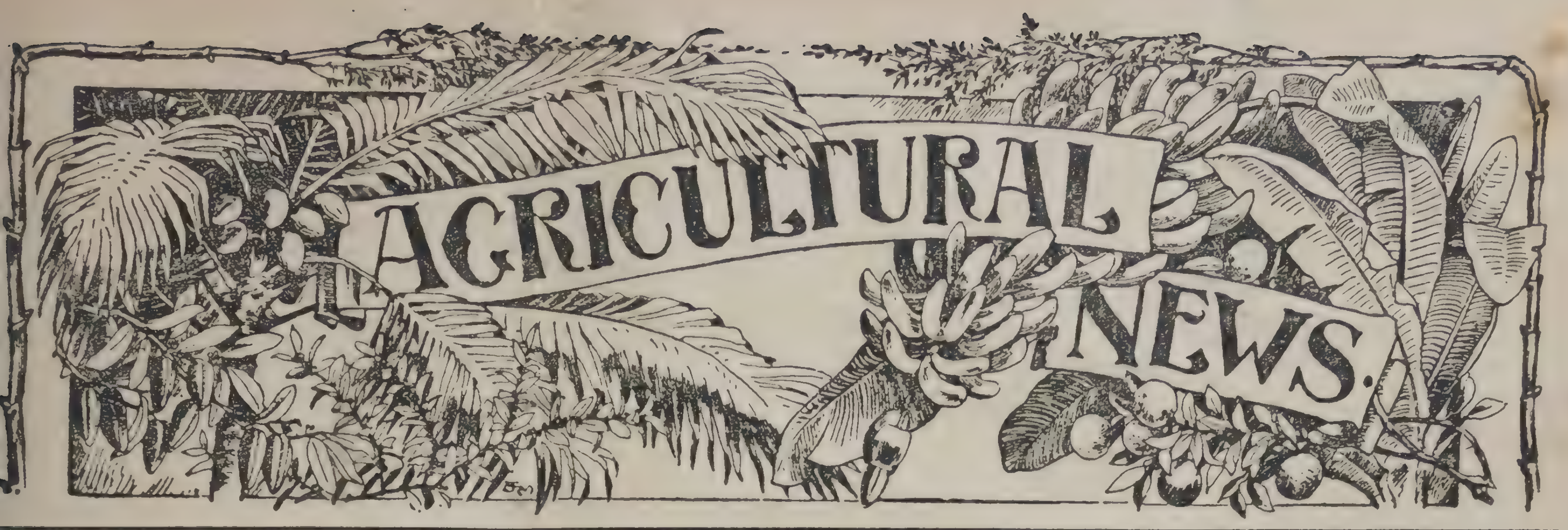
AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

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The Pruning of Trees and Care of Wounds.

GENERALLY speaking, pruning consists in the removal of certain portions of a plant that better results may be obtained m the remainder. The operation is usually associated with the removal of tree branches with saw or knife. It must, however, be remembered that the term pruning also includes minor operations, such as topping, disbudding, 'nipping' and suckering. In fact the careful horticulturist will endeavour to avoid the cutting of thick branches and will rather train the tree to the required shape by the judicious removal of buds and young shoots, thereby saving a great expenditure of food and energy and the risk of leaving open wounds that may become infected by disease-producing spores.

The objects of pruning are various; but the aim is usually to change the form of a tree either for aesthetic or utilitarian reasons, or it may be to stimulate development in certain directions. Thus, garden trees are pruned to give them a prettier shape, and coffee trees are 'topped' in order that the berries may be more easily gathered; while in the case of the tobacco plant, the exhaustive process of seeding has to be prevented in order that the whole energy of the plant may be centred in the growth of the leaves. In other cases the object is very different. One of the most important considerations in the cultivation of such trees as cacao and coffee is to keep the centre of the trees free and open in order to admit of a proper circulation of air and exposure to sunlight. If this precaution be not taken, the growth in the centre of the tree becomes dense and matted and the dark, damp shelter affords an excellent lurking place for insects and fungi.

Attention has already been drawn in the *Agricultural News* (Vol. II, p. 72) to the fact that wounds, unless properly treated, are open doors for the entrance of wound parasites, and further, that carelessness in pruning and the picking of fruit is often responsible for these wounds. One or two instances might be mentioned. In removing large boughs the mistake is frequently made of commencing the cut from above. The result is that the weight of the falling bough causes a large piece of the trunk bark to be torn off. Similarly, labourers may frequently be seen pulling cacao pods from a tree instead of cutting with a sharp knife: this also results in unncessarily wounding the tree.

There is however no reason why pruning should be a cause of injury, if a little consideration be given to underlying principles.

With a view to preventing injury when large boughs have to be removed, it is advisable always to make two distinct cuts with the saw. First saw half through the bough from below upwards, then complete from above. The splitting of the bark will in that way be avoided. In all cases where large wounds are made, a layer of tar should be applied as a protective covering. This will not only prevent the entrance of borers and spores, but will also prevent loss of water by evaporation and the consequent drying and cracking of the tissues. As an additional safeguard the cuts should be made in a slanting, rather than a horizontal, direction to prevent the settling of water, although it is advisable that no more surface should be exposed than is absolutely necessary.

Further, every opportunity should be given to the tree of healing its own wounds. With this in view, care must be taken to leave all cuts as clean and smooth as possible; after sawing through a bough, the surface should be smoothed over with a sharp knife. All cuts must be made as close to the supporting bough or trunk as possible. When a branch is cut some distance from the trunk and a stump left, the end rarely heals over, but usually rots and damage may be caused by the decay spreading to the trunk. It will thus be seen that judicious pruning aims also at assisting the plant to heal itself in the shortest possible time.

In these islands, too, trees are frequently injured by wind. When branches have in some such way received an injury, immediate attention should be given to the rent. To prevent the entrance of insects and spores the branch must be trimmed back so as to expose only a clean, even wound that the tree will be able to heal over.

Attention must also be paid to the removal of all dead and diseased branches. If these are left, not only is there a certain amount of risk that they may fall and do further damage to the tree, but they also act as breeding places for injurious insects and fungi. Such branches must be cut well back to the healthy wood.

In *Bulletin* No. 25 on 'Shade trees,' issued last year by the Cornell University Agricultural Experiment Station, useful information is given with reference to 'Pruning and caring for wounds,' and there are also illustrations which bring out very clearly the importance of paying attention to some of the points mentioned.

SUGAR INDUSTRY.

New Varieties of Sugar-cane at St. Kitt's.

Mr. Wm. Lunt, Curator of the Botanic Station at St. Kitt's, has forwarded the following letters, received by him from planters in that island. From these letters it will be seen that there has been a considerable increase in the yield from the estates mentioned since the introduction of new varieties of sugar-canes.

Mr. Lunt hopes to send us shortly a statement of the acreage planted in the various varieties throughout the island.

Mr. D. S. Blake, of Willett's estate, writes:—

For the information of the Imperial Department of Agriculture, I enclose a memorandum of the acreage of the different varieties of sugar-cane reaped on my estate (Willett's), in 1902 and 1903, from which you will find I have the better part of the cultivation in B. 147.

This estate was formerly materially affected by the ravages of fungus and borer, and it is most gratifying to me to be able to state that, in consequence of the introduction of the new varieties of cane, notably B. 147, the output of sugar from the estate has very materially increased, and I am certain that when I put such increase at 33 per cent., I am not over estimating it.

The B. 147 variety on Willett's estate is perfectly free from the attacks of fungus and materially resists the borer, whereas the Caledonian Queen, which was formerly cultivated there, became an easy prey to both; and in substantiation of this I may mention that many cases have come under my notice in which a few plants of the Caledonian Queen got mixed with B. 147 in planting. All of the B. 147 plants grew to maturity, sound and free from fungus, whereas most of the Caledonian Queen died before maturity from the effects of fungus and borer.

The B. 147 appears particularly suited to Willett's estate where a good rainfall is obtained, and the trouble of establishing this variety is more than counterbalanced by the excellent results obtained therefrom.

Memorandum of acreage of varieties of cane reaped at Willett's estate, St. Kitt's, 1902 and 1903:—

escription of cane.	*Acreage reaped.* 1902.	*Acreage reaped.* 1903.
B. 147	130	160
B. 208	0	1½
B. 109	0	1
Caledonian Queen	10	0
White Transparent	20	9

Mr. Fred. A. Burt, of La Vallee estate writes:—

As you have taken great interest in my establishing a ew variety of sugar-cane on this estate and have rendered ne much valuable assistance, I think you would like to now how I have succeeded.

In March 1899, I imported 1,500 plants of B. 147 from arbados, and got sufficient plants in November and ecember 1899, from the canes they produced, to plant and upply 9½ acres for 1901 crop. Of the 9½ acres, I cut 2½ cres for plants and got sufficient plants to plant and upply 33 acres for 1902 crop and also sold 84 plants.

I now plant 45 acres of B. 147 for my crop ach year and 7 acres of White Transparent. I only lant 52 acres each crop and the B. 147 has done so vell that I do not care to try any other varieties as, the state being very small, I have no room to try many.

Some fields of the B. 147, last crop (1902), gave 3 tons ugar per acre and none less than 2 tons. This crop (1903) am getting 3 tons and 2½ tons sugar per acre from plant ane and 2 tons per acre from ratoons.

I have to thank you very much for the valuable ssistance you have given me in establishing this variety of ane, which has been the salvation of me with the present low rice of sugar.

emerara Seedlings in Louisiana.

The *Sugar Planters' Journal* of September 12, as the following account of the success that has ollowed the introduction of two Demerara seedlings nto Louisiana:—

In a recent conversation with Mr. Henry Tremoulet, ho has upwards of 300 acres of the two Demerara canes on ne Helvetia plantation, secured after propagating them for ve years, we learned from him that they are both so uperior to the home canes in most respects, that they will be rown to the exclusion of the latter on Helvetia. He tells s that, in the campaign of 1901-2, a run was made with . 95, or red cane, and that it yielded 20 ℔. more sugar per on of cane than did the old purple variety on the plantation, rown and milled under similar conditions. D. 74 was tried 1902-3, but it was not found to give more sugar than id the 95 variety the year before, although 5 to 6 tons cane er acre were secured above the common variety yield.

Mr. Tremoulet considers the 95 cane possesses some dvantages over the 74, and *vice versa*, and he has decided keep both varieties. The 95 he considers an earlier pener than the 74, though the 74 is the more vigorous rower. In favour of the D. 74 cane, we are told that it pparently withstands the drought better than the 95, while also grows and maintains its colour better.

We are led to think that in choosing the cane to be ropagated, it would be best for a planter first to satisfy imself as to their respective merits by actual experience. et him propagate supplies of both varieties, for they are oth undeniably better than the canes now grown on ouisiana plantations, and then choose the one desired to be tained, or, perhaps even better, retain both the red and hite.

COTTON.

West Indian Cotton at Liverpool.

The Hon'ble Francis Watts has forwarded the following report by a firm of Liverpool brokers' on a sample of cotton grown on Hothersal estate, Barbados, received from Mr. H. Crum Ewing:—

We refer to ours of August 25, and have to inform you that we got an excellent report on your sample, which is considered a particularly nice style of cotton, apparently grown from Sea Island seed. The sample is long and silky, and at to-day's value would be worth 14*d.* per ℔.

With regard to your inquiry as to what the cotton would fetch when the market is in a normal state, the values would be ruled entirely by the supply and demand of Sea Island cotton, quite irrespective of prices for the ordinary American description, that is, middling American might drop 1½*d.* to 2*d.* below present quotations without influencing values for Sea Island cotton in any way, which has a special and limited market of its own. The range of value in Sea Island descriptions is very great, from 13*d.* for medium fine to 21*d.* for extra fine—probably at any period of the last twelve months, cotton equal to your sample would have brought 13*d.* to 14*d.* per ℔.

The further inquiry by us:—'We think that the sample quality of cotton is being planted to a considerable extent in the West Indies, and we would like to know if the market could take it up at the price you indicate, if it came forward in large quantity'—brought the following interesting reply:—

'We are in receipt of your letter of August 28, with inquiry as to the amount of cotton (equal to your sample) which this market could absorb, at the value put upon it by our brokers.'

The opinion here seems to indicate that spinners will take up all they are *likely* to have offered. The experience being that so little of this quality can be grown satisfactorily over a series of years. We give you the figures for Sea Island descriptions for the last four years, that is total sales and prices (fine and extra fine) as follows:—

1900	1901	1902	1903 (to date).
350 bs.	890 bs.	130 bs.	280 bs.
13½*d.* to 21*d.* per ℔.	13*d.* to 20*d.* per ℔.	13*d.* to 20*d.* per ℔.	13*d.* to 21*d.* per ℔.

You will see that the quantity sold has not been large, and over the period named prices have kept remarkably steady.

This cotton is principally used for making a specially fine thread used in needle work and lace working. It is an expensive article, and it is doubtful to what extent the demand would expand, without some shrinkage in value, if the supply were to be increased to any very *large* quantity.

Cotton in Porto Rico.

According to the *New York Herald* it is anticipated that about 10,000 bales of 'the finest Sea Island ever grown,' will be the output of Porto Rico for the current season. It continues:—

The best yields will exceed 1,500 ℔. seed and fibre to the acre, and of sixty-eight experiment plots all will show a profit. Nothing but Sea Island cotton has been planted and the tendency here is to encourage, as far as possible, the growing of that grade only.

WEST INDIAN FOODSTUFFS.

The following notes on 'Emergency Foodstuffs,' prepared after the hurricane which struck Jamaica on August 11, by Mr. H. H. Cousins, M.A., F.C.S., Government Analytical and Agricultural Chemist, are taken from the *Gleaner* of August 24. The tables bring out in a very clear manner the relative values of the chief West Indian foodstuffs:—

There are thousands who have now to face a double problem. First, the restoration of the damaged cultivation so as to meet the markets with good success with the next crop, and secondly, how to keep the body fed and nurtured in the interval. It is not only a problem of growing the maximum of food in the minimum of time, but further of so adjusting the food products that a suitable combination may be produced. It is at a time like this that the true value of a grass piece, a cow and a few pigs becomes so apparent. No agriculture is permanent and secure that does not include live stock as a necessary adjunct of its existence.

I have prepared the following tables to give a general idea of the bearings of the food question in a time of scarcity, as at present:—

Table I. gives two items: the number of pounds of flesh-forming material per ton in the first column and the fuel value per ℔. in the second.

The first represents the value of the foodstuff for maintaining bodily condition and making good the wear and tear of tissue. The second sums up the total value of the food as fuel for the human engine. Table II. gives the number of pounds of each food, *eaten alone*, required by a Jamaica labourer *(a)* to maintain his bodily condition, and *(b)* to enable him to develop enough mechanical energy for a moderate day's work. These figures show the great deficiencies of some of our foodstuffs and the special value of others for use in conjunction therewith, so as to produce a well-balanced dietary.

I.—Table of Foodstuffs.

Foodstuff.	Flesh-formers. ℔. per ton.	Fuel value per ℔.
Sweet potato	42	440
Irish potato	36	295
Dried banana	32	1,456
Breadfruit	47	823
Mango (pulp) No. 11	8	318
Cocoa-nut	58	2,50
Baker's bread	180	1,30
Rice	160	1,62
Cornmeal	184	1,64
Beans (shelled)	142	54
Peas (dried)	428	1,50
Salt fish	320	32
Fish (fresh	200	37
Pork (fresh)	260	1,30
Molasses	nil	1,22
Cow's milk	66	31

II.—Food Requirements of Labourer in Jamaica.

(POUNDS PER DAY.)

Foodstuffs.	To maintain bodily condition.	To satisfy workin requirements.
Sweet potato	9 ℔.	7¾ ℔.
Irish potato	10 ,, ...	12½ ,,
Dried banana	12 ,, ...	2⅓ ,,
Breadfruit	8 ,, ...	4 ,,
Mango (pulp)	47 ,, ...	10¾ ,,
Cocoa-nut (meat) ...	6½ ,, ...	1⅓ ,,
Baker's bread	2 ,, ...	2⅝ ,,
Rice	2⅓ ,, ...	2 ,,
Cornmeal	2 ,, ...	2 ,,
Beans (shelled) ...	2½ ,, ...	6¼ ,,
Peas (dried)	14 oz.	2¼ ,,
Salt fish	1¼ ℔.	10½ ,,
Fresh (fish)	1⅞ ,, ...	9¼ ,,
Pork (fresh)	1½ ,, ...	2⅝ ,,
Molasses	Useless	2¾ ,,
Cow's milk	½ gal.	1 gal.

The tables bring out clearly, the very great value sweet potatos. It is, as a famine food, far superior any other staple we can grow in Jamaica. Withou question it will yield in a given time a larger retur of actual food than any other product we can grow. It i however, very deficient in flesh-producing properties. would require a man to eat 9 ℔. of sweet potatos to obtai enough material to repair the daily waste of his bodil tissues.

On the other hand, beans and peas (cow peas and th quick-increase) are very rich in flesh-forming constituent They are the poor man's meat.

Salt fish, fresh fish, pork and cow's milk are a admirable, if obtainable, as an adjunct to a sweet potato die Of cereals, cornmeal is undoubtedly the most economical f a famine diet. For a given expenditure in importe foodstuffs, this would maintain life and strength for th longest time.

TORONTO EXHIBITION, 1903.

The following is a report on the Toronto Exhibition, 1903, by Mr. G. Whitfield Smith, Travelling Superintendent, to the Imperial Commissioner of Agriculture for the West Indies, dated September 14, 1903:—

The West India Section occupied the centre of a separate building labelled 'New Ontario,' situated conspicuously on the right of the main entrance to the Exhibition Grounds on King street. The collection was tastefully arranged and decorated, and undoubtedly formed the most attractive feature in this building.

The exhibits from each colony may thus be briefly described:—

Demerara: Among the splendid samples of sugar and sugar products, those exhibited by the Colonial Company were especially worthy of notice. Covenden plantation contributed a fine exhibit of coffee and plantation 'Leonora' a sample of cattle food (molascuit). The latter attracted considerable attention and there were many inquiries from visitors respecting its use and method of preparation. Several interesting samples of rum were also among the exhibits from this colony.

Jamaica: This colony was represented by a valuable collection of economic products of all kinds. Among these, mention may be made of the fine exhibit of rum and bitters by Mr. G. Eustace Burke. The honey samples, contributed by the Bee-keepers' Association, and the starch exhibits of the Jamaica Agricultural Society were also much admired. Perhaps the most attractive feature of the Jamaica Court was the excellent collection of photographs of tropical scenery and vegetation in that colony. These were enticingly displayed at the base of the exhibits and seemed at once to arrest the attention of visitors who were then led to make inquiries concerning the products exhibited above them.

Barbados: The collection of economic products, though small as regards variety, was yet remarkable for the excellent quality of the exhibits themselves, and for the careful and attractive manner in which the samples were prepared and displayed. The exhibits of muscovado sugar from Bennett's estate, of white crystals from Bulkeley estate, as also the samples of molasses were much admired. An exhibit of 'coloured rum' of exceptional quality was contributed by Messrs. G. W. Hutchinson & Co. The exhibits of manjak also attracted considerable attention.

St. Vincent: An interesting collection of exhibits and photographs represented this island. Among the former the samples of cacao, contributed by Messrs. D. K. Porter & Co. and Mr. V. Hadley, and also the exhibits of arrowroot from Wallilabo and Mount Bentwick estates were much admired. An exhibit of cassava cakes contributed by Mr. P. F. Huggins attracted considerable attention. I was fortunately able to give some of the visitors a short account of the cassava plant and the method of preparing these biscuits which seemed to be of great interest to them.

Grenada: As was to be expected, Grenada was well to the front with exhibits of cacao, nutmegs and other spices. Although the samples shown had been held over from the exhibition of last year, the products were in an excellent state of preservation, and the handsome glass jars, in which the specimens were put up, displayed them to the best advantage.

Tobago: An interesting collection of cacao, coffee, nutmegs and fibre exhibits was contributed.

St. Lucia: Among the exhibits from St. Lucia, mention may be made of the fine sugar samples displayed by the Cul-de-Sac factory. There were also several interesting exhibits of cacao, coffee, nutmegs and starches from this colony.

Dominica: This collection appeared to attract the special interest and attention of visitors. A great number and variety of products in excellent condition were displayed. When it is remembered that the collection had been held over since the Toronto Exhibition of last year, it will be realized that great care must have been taken in preparing the specimens in the first instance. In this collection it is difficult to single out exhibits of special merit, but among those in the front rank, which were generally admired, may be mentioned the sample of essential oil of limes, contributed by Dr. H. A. A. Nicholls, C.M.G., and exhibits of distilled lime oil shown by Messrs. A. J. Stephenson and A. E. Agar. A fine sample of cacao was exhibited from Point Mulâtre estate; while among the spices, the exhibits of nutmegs and mace by Dr. Roe Williams were generally admired. Interesting samples of refined lime juice, citrate of lime and other products were also contributed by the Rose Lime Juice Company, Messrs. Rowntree & Co., and Messrs. Potter and Geo. Branch.

Montserrat: An excellent sample of Sea Island cotton was exhibited from Montserrat. I was informed that the sample had been favourably commented on by one of the visitors to the Exhibition, a planter from the cotton district in Georgia, who considered the quality of the Montserrat staple slightly superior to that grown in the Southern States of America.

Antigua: This section also contained several exhibits of interest, among which may be mentioned samples of cotton, honey, starches and fruit preserves.

On all sides I heard the most favourable and gratifying opinions expressed as to the success of the West Indian Section at this Exhibition as a means of bringing these colonies before the Canadian people. Many Canadian gentlemen (manufacturers and merchants), visitors to the Exhibition with whom I conversed, assured me that they knew little of the West Indies or their products, before the inauguration of a West Indian Court at the yearly industrial Exhibition held in Toronto. All, however, now seem keenly desirous of fostering and encouraging those trade relations between the West Indies and the Dominion which are of such moment and importance to the former at the present juncture.

In conclusion I should like to bear testimony to the excellent arrangements made by Messrs. Pickford & Black not only with regard to displaying the West Indian exhibits to the best advantage, but also to the valuable personal assistance rendered by Mr. Charles Pickford in affording information in reply to the numerous questions of visitors regarding the products exhibited. In addition, over 10,000 pamphlets, giving a popular account of the West Indies and their products have been distributed by Messrs. Pickford & Black.

'Male' Sugar-canes. A short time ago the attention of the Department was called by Dr. Freeland of Antigua to the occurrence, in that island, of so-called 'male' sugar-canes. Mr. Watts has been good enough to supply the following information on the subject:—

What Dr. Freeland calls 'male' sugar-canes are simply canes in which the side buds are slightly, or not at all, developed. Some time ago he sent me specimens of these 'male' canes; in these I could trace the rudiments of buds in the normal position: these rudimentary buds might easily escape observation on cursory examination.

BEE-KEEPING.

The 'W.B.C.' Hive.

The following is a summary of a report by Mr. Lionel B. Mason upon a 'W.B.C.' hive, specially imported by the Imperial Department of Agriculture for experimental purposes:—

The chief objects of the experiments were to determine the cause of the incessant swarming so prevalent in Barbados and to ascertain if more honey could be secured by the use of this hive.

A considerable amount of trouble was experienced in getting a colony of bees established in the hive. Twenty-five and a half pints and fifteen sections were taken off during the season 1903, realizing altogether $7·54. The maximum amount taken off at one extraction was 13½ pints, the frames being thoroughly filled and sealed throughout. It will therefore be seen that taking the cost of the hive and the value of the bees in it at $7·00, there would remain a profit of 54 cents. To this must be added 72 cents, the value of a swarm which was caught on August 22, making a total profit of $1·26 for the first season. The honey flow, it may be stated, is very irregular in his district.

In comparison with the 'Root' 8-frame hive, the 'W.B.C.' hive has several advantages. Firstly, there is very little honey in the brood chamber; secondly, it is well ventilated and protected from the heat of the sun. The hive is what is termed a 'double-walled' hive, thereby allowing a continual flow of cool air to circulate around the brood chamber and super, and further, there is no need for a 'quilt' or cloth cover to be used with it. The spacing of the frames is another good feature. Tin spacers, known as the 'W.B.C. end spacers,' are employed, and by their use very little propolis is met with. The bees start storing honey sooner in the super and therefore advantage can be taken by the use of this hive of the short honey flows that occur here.

The first part of this season, swarming was prevented with the Root hives, afterwards the bees seem to have given up the idea, and I feel sure that, if I had had the 'W.B.C.' hives instead, I should not have had so much labour. Where I failed with the Root hives was in the length of time taken by the bees in sealing over the honey. As it is not good policy to take off honey before it is thoroughly sealed, this drawback can be readily understood. The 'W.B.C.' brood frames being smaller, I could have easily alternated two brood nests (see *Agricultural News* p. 140, Vol. II), and so avoided the difficulty met with in the case of the Root hive.

As far as I can see, the only point against this hive is the cost. The 'Root' hive can be imported and painted for about $3·00, while this hive costs about $6·00. But the extra cost of the 'W.B.C.' is, in my opinion, amply repaid by the many advantages which have been mentioned in this report.

In conclusion it should be stated that these observations chiefly apply to the country districts in Barbados where more skill is required to obtain the greatest yield per hive.

SCIENCE NOTES.

The Germination of Indian Corn.

The seed of a flowering plant consists, essentially, of a miniature plant together with a store of food, the object of which is to supply the young plant with the necessary materials for its growth, during the time in which it is unable to procure these for itself from the soil and air. Besides these most seeds possess a hard or tough coat, which serves to protect the inner parts of the seed until this is brought under conditions suitable for growth.

In many plants the reserve food is stored away in the young plant itself, usually in the first leaves, the 'seed-leaves,' or 'cotyledons;' this is the case, for instance, in the common beans or peas, the large, swollen seed-leaves of which contain a large amount of food, in the shape of starch and proteids. It is this stored food that makes seeds so valuable as food for men and animals.

In other seeds the food reserve is stored in a part of the seed, which is distinct from the young plant, and which is called the 'endosperm': This is well shown in the seed of the Indian corn (fig. 31). The young plant here is situated on one side of the seed, near the pointed end, where it can be seen as a white patch. The remainder of the seed is the endosperm *(A)*, containing the reserve food, which here consists mainly of starch.

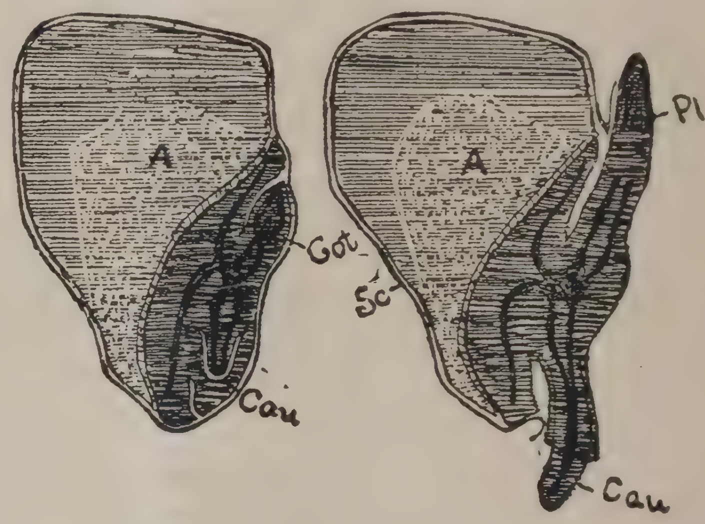

Fig. 31. Germination of Indian Corn.

There is only one seed-leaf in the maize seed and this has the form of a flat shield-shaped body, with its inner side lying on the endosperm; the rest of the young plant consists of the young stem with its leaves *(Pl.)*, and the young root (*Cau.*), the seed-leaf is attached to the stem by a broad stalk, as shown in the figure.

When the seed is placed under the proper conditions, the young plant starts to grow. The young stem and root, as shown in the figure, burst through their coverings, the stem grows up straight into the air, develops leaves and turns green; the young root grows down and fixes the plant in the soil. The shield-shaped seed-leaf secretes a digestive fluid, which converts the insoluble starch of the endosperm into sugar; this is then taken up by the seed-leaf and passed on to the growing plantlet. As the starch is dissolved and taken up, the seed-leaf grows on, filling the vacant space, it continues to dissolve and take up the stored food material of the endosperm until this is all consumed The young plant has, by this time, formed several more roots from the base of the stem, and by these and the leaves, which it has developed, it is now able to obtain the whole of its food supply from the soil and air.

THE PAPAW.

(*Carica Papaya.*)

The following interesting account of the numerous uses of the papaw chiefly by natives in Central and South America, is taken from an article by F. B. Kilmer that appeared in the *American Journal of Pharmacy* and was reprinted in the *Bulletin of the Department of Agriculture*, Jamaica, for August 1903:—

Quite universal is the knowledge of the unique property that has given to the papaw its world-wide fame, viz: the power of its milky juice to soften and dissolve tough meat. The statement has passed current in our journals that the emanations from this tree will dissolve and digest albumin, and that it is the custom of natives to hang meat and chickens in the branches of a tree to render them tender and edible. The natives often go further than this: they state that if male animals browse under the papaw tree, they thereby become emasculated. If we compare this statement with the alleged property of the roots as a generative tonic, we shall have a marvellous combination of an aphrodisiac and an anaphrodisiac in the same plant.

It is needless to urge that such stories are exaggerations of the pepsin-like properties of the fruit.

The native uses of the papaw are numerous and varied. The bark is used in the manufacture of ropes; the fruit is edible, and according to the local conditions, may be sweet, refreshing and agreeable, or in other localities it is sickly, sweet and insipid. The fruit finds a large consumption by the natives, and is considered very nutritious.

At the corner of a sugar-cane field where the ragged canes bend over in a wild green, brown and yellow tangle, there will be standing a papaw tree, and if the time of the papaw tree has quite come, beneath the tree will be assembled a half dozen negroes.

The ripe fruit is eaten as we eat melons. Salt enhances the flavour and some users add sugar. The melons must be perfectly ripe when eaten raw, as the green fruit contains a strongly marked acrid principle. The colour of the ripe fruit is more or less that of our very yellow musk-melon. The sweetness of its resinous, pulpy, juice clings to the tongue and remains prevalent for some hours.

The natives enjoy the flavour, while the stranger has to acquire the liking. Excellent preserves are made of the ripe fruit, which, for this purpose, is boiled down in sugar and candied (like citron).

At the sugar-houses slices of the papaw are often seen seething in hot syrup. The slices of melon combined with some acid fruit is made into native tarts, which articles correspond more or less to what we call 'pies.' The fruit is also stewed and served on the table. The green fruit is made into plain and spiced pickles, which are highly esteemed.

The fruit, just before ripening, is peeled and sliced, macerated in cold water, with frequent changes of water for some hours; the then macerated fruit is dropped into boiling water, boiled sharply and then served as a vegetable.

As an article of food one finds the papaw prepared in a score of ways making a variety of edible dishes, which, from the native standpoint, would be expressed in our language as 'wondrous and nutritious delicacies.'

A plant so universally distributed and possessed with such varied properties, naturally takes an important place in the native materia medica.

The seeds are reputed as anthelmintic and emmenagogue; they are also used as a thirst quencher, form component parts of a drink used in fevers, as well as being used as a carminative. Syrups, wines and elixirs made from the ripe fruit are expectorant, sedative and tonic.

A malady, which the natives call the 'cocoa bag,' is a troublesome tropical disease, reputed to be hereditary and contagious; at all events it seems to lurk in the blood of persons of otherwise apparently good health and habits. Suddenly the victim becomes a mass of offensive sores, debilitated, etc. The native doctors add the papaw fruit to the diet drinks used in this disease, and succeed in moderating its violence, at least. To the sores a paste made with the papaw milk as one of the constituents is also applied.

The slight pimples accompanying the first stages of the yaws soon spread into ulcerous sores that cover the entire body. Here, too, the claim is made that a slice of the papaw rubbed over the pimples will abort them. It is also claimed that the ulcers may be cleaned in a similar fashion.

I witnessed a most striking cleansing of a black foot in which the chiga had bored and laid its eggs, producing a mass of foulness beyond description. Here a paste of the papaw milk was pushed into the seething mass and kept there for forty-eight hours. It was then flushed, curetted, and antiseptics were applied. A clean wound, which readily healed, resulted.

The green leaves or slices of the green fruit of the papaw are rubbed over soiled and spotted clothes, and by its power of dissolving stains, papaw has acquired the name of 'melon bleach.' The leaves or a portion of the fruit are steeped in water and the treated water is used in washing coloured clothing, especially black, the colors are cleaned up and held fast.

The seeds are eaten as a delicacy. They have quite an agreeable taste, something of the order of water-cress and a piquancy slightly suggestive of the mustard family. Macerated in vinegar they are served as a condiment.

The strange and beautiful races of the Antilles astonish the eyes of the traveller who sees them for the first time. It has been said that they have taken their black, brown and olive and yellow skin tints from the satiny and bright hued rinds of the fruit which surround them. If they are to be believed, the mystery of their clear, clean complexions and exquisite pulp-like flesh arises from the use of the papaw fruit as a cosmetic. A slice of the ripe fruit is rubbed over the skin and is said to dissolve spare flesh and remove every blemish. It is a toilet requisite in use by the young and old, producing, according to the words of a French writer, 'the most beautiful specimens of the human race.'

The meat in these countries is tough and tasteless, beef, mutton, pork, or fowl have the same flavour, and are as tough as hickory wood; boiling until they fall to pieces does not render them any more tender, they simply change from solid wood to fine tough splinters.

One reason for this is that in this climate meat must be eaten immediately after slaughter. (It often reaches the pot in an hour after killing.) The papaw helps to overcome this. Rubbed over tough meat it will render it soft and change a piece apparent of leather to a tender, juicy steak. It is put into the pot with meat, enters into cereals, soups, stews, and other dishes, and they are made at least more edible and digestible.

The preparation of commercial papain from the milk of the papaw is described in the *Agricultural News* (Vol. I, p. 4). The fresh juice is stated to be a cure for ring-worm. At Montserrat a small industry has been established in the manufacture of papain, which affords the means of livelihood to many of the peasantry.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 287 of this volume.

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NOTES AND COMMENTS.

Recent Department Publications.

During the last fortnight the Imperial Department of Agriculture has issued the *Annual Report* on the Botanic Station at St. Kitt's-Nevis. This completes the publication of the Annual Reports of the Botanic Stations of the West Indies. Two pamphlets (Nos. 25 and 26) have also been issued. These are *Ground nuts in the West Indies*, a reprint of an article by Mr. W. G. Freeman, B.Sc., A.R.C.S., F.L.S., in the *West Indian Bulletin*, Vol. IV, No. 2, and *Seedling and other canes at Barbados, 1903*. These publications can be obtained of all agents of the Department.

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Cotton in St. Vincent.

A report has recently been furnished by Mr. Thomas Osment, Agricultural Instructor, St. Vincent, on the state of the cotton cultivation on the land allotments.

Fifty-two lb. of cotton seed has been distributed in connexion with this scheme, and there are now some 9 acres under cotton. This land is in the hands of eighteen allottees. The cotton appears to have grown well and considerable interest is being taken in the cultivation by the allottees, who greatly appreciate the assistance that is to be given them by the erection of the proposed Central Cotton Factory.

Mr. Osment reports that, so far, no damage has been caused by insect pests. It is expected that the cultivation of cotton will be considerably increased next year on these allotments.

Agriculture in the Malay States.

The Agricultural Bulletin of the Straits and Federated Malay States, for July, contains reports on Planting and Agriculture in 1902.

The reports state that further experience confirms the belief that the soil and climate of these states are pre-eminently suited to the cultivation of cocoa-nuts and rubber (both Para and Assam), while considerable success has been attained in sugar cultivation. The area under Para rubber at the end of 1902 was approximately 16,000 acres.

A Federal Inspector has recently been appointed, under the 'Cocoa-nut Trees Preservation Enactment,' to ensure 'united and systematic action against the enemies of the cocoa-nut palm—beetles, rats, wild pig and porcupine.' Over 40,000 acres are reported to be under cocoa-nuts.

From the report on the Selangor Experimental Plantations we learn that experiments are being made with Lagos silk rubber, various species of coffee, etc.

◆

Bulletin of the Imperial Institute.

The Bulletin of the Imperial Institute, No. 1, which is published as a supplement to the *Board of Trade Journal* of May 21, contains much interesting matter connected with West Indian agriculture.

As an introduction there is given a short account of the history and work of the Imperial Institute, including the Indian and Colonial Collections and the Scientific and Technical Department. Notes are published on recent additions to the Indian and Colonial Collections and on products recently received from British Central Africa.

Among the reports of recent investigations by the Scientific and Technical Department, may be mentioned 'The investigation of poisonous fodder plants and food grains.' In this paper mention is made of sorghum and cassava poisoning in the West Indies.

Results are given of the examination of coal from Trinidad and koalin from St. Vincent. In the case of the coal it is stated: 'These results show that the coal is of inferior quality, the percentage of fixed carbon being only about one-half of that of first-rate steam coal, and the calorific and evaporative values being also inferior. The coal, moreover, leaves a large proportion of ash. If the sample now submitted were taken from the surface of the seam, its inferior quality may be partly due to the weathering consequent on exposure to air and water.'

With regard to the clay from St. Vincent, the report from the pottery was to the effect that it was 'not satisfactory when burned, being too porous and short and also too infusible.' The sample however possessed the satisfactory property of remaining white after burning and showing no discoloration from the presence of impurities. The chemical analysis of this substance shows that it contains a much larger proportion of silica than representative samples of koalin or China clay used in the manufacture of porcelain. This would render it infusible. Further trials are to be made with a larger supply.

Agriculture in the German Colonies in Africa.

The *Pharmaceutical Journal*, of August, reprints an article, published in the *Berichte der deutschen Pharmaceutischen Gesellschaft*, entitled: 'Plant cultivation in German Colonies.'

Reference is made to the efforts of Germany to render herself independent of foreign countries for colonial produce by the establishment of the cultivation of various useful plants in her African colonies.

In 1889, the government established a Botanic Station in Victoria, at the foot of the Cameroon mountains, for the purpose of ascertaining the requirements of various plants as regards climatic and other conditions, and in order to produce seeds and plants for distribution. Among the crops extensively cultivated, cacao may be specially mentioned. The trees grew in a satisfactory manner, but the quality of the cacao was poor and did not obtain as high a price as had been anticipated. With a view to ascertaining the cause, Dr. Paul Preuss visited the West Indies and Central and South America to study the different varieties of cacao and the methods of cultivating them. As a result of this inquiry, the prospects of cacao cultivation have improved.

Oil-nut Cake as a Manure.

The *Journal of the Board of Agriculture* (Vol. VIII, p. 250) states that reference is made in a memorandum, prepared by the Consul-General at Marseilles, to the use of castor-oil seed cake as a manure. It is pointed out that Marseilles possesses an advantage over British manufacturers of castor-oil for industrial purposes in that there is a ready sale for the oil-seed cake. The residue is said to be about 60 per cent. of the seed used, and it is estimated that from 15,000 to 20,000 tons of the cake are annually utilized, within a short radius of the City, by market gardeners for the raising of early vegetables.

Dr. Voelcker, in his *Report on the Improvement of Indian Agriculture*, states that large quantities of this substance are used in India, under the name of 'castor poonac' in the cultivation of sugar-cane, ginger, coffee, etc. A sample of castor poonac, analysed by Dr. Voelcker, contained 4·52 per cent. of nitrogen and 2·86 per cent. of phosphates.

In the United States oil-nut cake is in common use as a fertilizer under the name of 'castor pomace'. According to the *Report of the Connecticut State Agricultural Station*, for 1900, the price per ℔. of nitrogen in five samples of this fertilizer varied from 15c. to 20c., when the nitrogen in nitrate of soda was valued at 14c.

It will thus be seen that the refuse, left after the extraction of oil from castor-oil seeds, has a high manurial value, and it should, in consequence, be returned to the soil whenever possible. There are factories in the West Indies where considerable quantities of castor oil are extracted and used in the manufacture of soap; the by-product might well be placed on the market as a fertilizer.

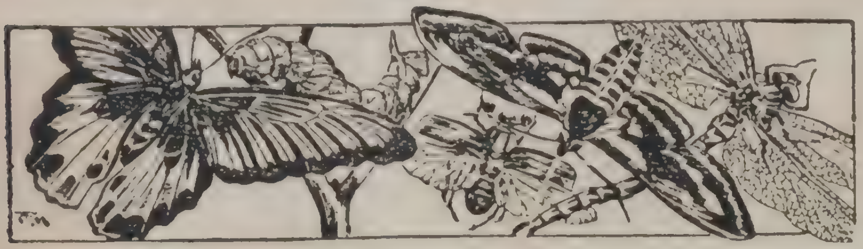
The Toronto Exhibition, 1903.

We publish on p. 325 a very interesting report by Mr. G. Whitfield Smith, upon a visit paid by him to the Toronto Exhibition on September 12. It will be seen from this report that the West Indies have been well represented and the exhibits sent from the various islands have attracted considerable attention. Mr. Whitfield Smith testifies to the great care and taste displayed in preparing the exhibits, and we think the various officers of the Department and others, who have taken part in this work, are to be congratulated upon the success which has accompanied their efforts.

The Exhibition cannot fail to assist in fostering trade relations between Canada and the West Indies by bringing the products of these colonies to the notice of Canadian merchants and manufacturers.

A correspondent writes on the subject of trade relations with the West Indies in the *Toronto World*, of September 8, as follows:—

> The fine display of the resources of the British West Indies, in charge of Mr. C. S. Pickford, of Halifax, is a tasty exhibit of the natural and manufactured articles common to Bermuda, St. Kitt's, Antigua, Montserrat, Dominica, St. Lucia, Barbados, St. Vincent, Grenada, Tobago, Trinidad, Demerara and more remote sections. It is worth the time of any Canadian, who may visit the Fair, to inspect these various bottled goods, tins, fruits and metals and ores. More than one thousand glass receptacles are displayed here, each with some rare vegetable substance, the product of these British isles on this side of the water. Unless you have studied the question, it is impossible for you to conceive the wealth and variety of this exhibit. It is the tropical richness that is displayed, and everything is necessary to the everyday consumption of the people of the Dominion. The essential oils of rarest quality, every vegetable common to the tropics and fibre articles of hand manufacture are to be purchased in enormous quantities from these islands. Molasses, molasses sugar, rum of the famous Jamaica variety, cacao, coffee, hides, charcoal, fish glue, fine woods, cocoa-nut oil, and starch are some of the articles being exported to Canada from the British West Indies.
>
> In return Canadian produce and manufactured articles of great bulk are being exported to that section of the British colonial empire. These people consume Canadian fish, wheat and oats, hay, butter, cheese and considerable quantities of manufactured articles. The exchange is increasing in quantity annually. Here is a character of reciprocity that is calculated to stimulate the industries of both countries. There is no preferential tariff in the West Indies for Canadian goods, but there is a very well-defined community of interest manifested for the commerce of those countries within the empire. For instance, as an evidence of the volume of the business those colonies are doing, in 1901 British Guiana exported 95,016 tons of molasses sugar, while last year the exports of the same article amounted to 121,230 tons.
>
> Since the people of those islands prefer to trade with Canada, everything else being equal, the Dominion is striving to encourage the relations. The volume of business, now developing between the two sections of the British colonies, promises to increase enormously within the next few years. The trade of the islands is valuable, the products are tropical and do not conflict with Canadian resources, and altogther the situation is most favourable to increased business.



INSECT NOTES.

The Cotton Worm.

Cotton in this island is just now seriously attacked by a caterpillar which eats the leaf. The insect spins its cocoon upon the leaf, drawing up the edges of a portion of it so that the pupa, which is inside, is entirely concealed. Certain fields have spots nearly stripped by this caterpillar, which is a voracious eater. When fully grown it is nearly 1½ inches long, greenish in colour, with a dark stripe along the middle of the back, which varies in different specimens from a very faint black line on either side of the middle to a broad purplish black band, bordered on either side with a narrow whitish line, with a fine white line in the middle. This is one of the 'loopers,' or 'measuring worms,' and can easily be distinguished by its peculiar method of walking.

The remedies for this pest are the use of poison and hand picking.

In certain cotton-growing States dry, undiluted Paris green is used as the poison. This is applied by means of cloth bags, at the ends of a pole long enough to reach two rows at once. A boy rides on a horse or mule between the rows and, by jarring the pole, dusts the poison on to the plants. This method has been very successful and is in general use.

In Barbados good results have been obtained from the use of a mixture of Paris green with dry, air-slaked lime, applied by hand from a coarse cloth bag. This mixture may vary to suit the case in hand; for slight attacks 1 ℔. of Paris green to 100 ℔. lime; for severe attacks 1 ℔. of Paris green to 50 ℔. lime may be used. London purple may be used in this mixture. At the present time the supply of London purple and Paris green in this island is exhausted, and for the next few weeks hand picking of the worms and pupae will have to be practised. This is being done on several estates and it seems to be entirely practical. After a little experience the labourers will detect the presence of the caterpillars on the leaf and of the pupae rolled up in the leaf, and the work can be done rapidly. The insects when caught, can be dropped into kerosene or lime water and thus killed.

On one estate the practise of killing worms and pupae on the leaves is being tried and appears to give good results. This is done by squeezing them between the thumb and finger; in this way the insect is killed and the leaf may be left on the plant. This method is much faster than the collecting and does no damage to the leaf.

On most fields, at the present time, the majority of the caterpillars have reached maturity and having spun their cocoons, are now in the pupal stage. As it will be only a few days before the moths begin to emerge, and as each female moth lays a large number of eggs, the advantage of taking some steps to destroy as many of the pupae as possible, while they can so easily be reached, will be apparent.

Insecticide Studies.

Pyrethrum powders and all insect powders, containing pyrethrum as the principal active substance, are generally advertised as perfectly harmless to human beings. This is the case when the pyrethrum is pure, but the Bureau of Chemistry of the United States Department of Agriculture, in its Bulletin No. 76, gives analyses to show that it is frequently adulterated with compounds of lead and other metals, chiefly, with lead chromate.

In a recent number of the *Agricultural News* (Vol. II, p. 267) mention is made of a Bulletin from the Bureau of Chemistry, No. 68, giving analyses of large numbers of standard insecticides and many patent preparations. The present Bulletin, entitled 'Insecticide Studies,' discusses the subject of pyrethrum powders containing poisonous metals, and gives a compilation of analyses of insecticides and State laws governing their sale and compositions.

Such work cannot fail to have good results. The purchasing public will in time get to know the pure from the adulterated substances and the valuable from the worthless: and manufacturers and dealers will be compelled to handle only such materials as will give satisfaction. A true and unbiassed analysis of insecticides distributed would probably produce good results similar to those following the introduction of fertilizer and feeding stuffs Acts in many countries.

CORN OIL.

The *Chamber of Commerce Journal* for September, has the following reference to the development of a corn oil manufacturing industry:—

> As an article of commerce, corn oil has become of so great value that many corn millers are investigating the process of manufacture, and establishing plants for its manufacture and production with their milling business. The oil is pressed from the germ of the corn when meal, grist, etc., are made. This portion of the seed was pratically lost until the present processes of extracting oil were discovered. In its preparation the germ is ground and pressed in much the same way that flax and cotton seed is treated in the manufacture of linseed and cotton seed oil. It is said that the annual output of corn oil in the United States is about 160,000 barrels, the principal consumers being white lead and putty manufacturers, paint manufacturers and soap makers. Corn oil is also extensively used by the manufacturers of prepared paints, although few of them will admit it. Its use in the foreign markets is said to be principally among the manufacturers of a superior quality of soft soap. It commands a higher price than any other oil used for this purpose. The oil is also employed as an adulterant for table oil. It is easily purified, forming a light, amber coloured, perfectly transparent liquid, without rancidity, and having a pleasant taste. It is also used for lubricating purposes, and may even be used as a lamp oil

OUR BOOK SHELF.
NOTES and REVIEWS.

FIRST REPORT ON ECONOMIC ZOOLOGY: By F. V. Theobald, M.A. *London: Printed by order of the Trustees of the British Museum, 1903.*

The first sentence of the preface to this attractive volume may well be quoted: 'The present volume consists primarily of a series of reports to the Board of Agriculture, of reports and letters to a variety of unofficial correspondents, and of reports to the Foreign Office and to the Colonial Office, drawn up by Mr. F. V. Theobald during the years 1901-2.'

In addition to these reports there is given an introductory scheme for the classification of animals according to their value, injury, etc., from the point of view of Economic Zoology. The following headings of groups will serve to indicate the lines along which this classification is made:—

A. Animals captured and slaughterd by man for food or for the use by him in other ways of their skin, bone, fat or other products.

B. Animals bred or cultivated by man for food, or for the use of their products in industry, or for their services as living things.

C. Animals which directly promote man's operations as a civilized being, without being killed, captured or trained by him.

D. Animals which concern man as causing bodily injury, sometimes death to him, and in other cases diseases often of a deadly character.

E. Animals which concern man as causing bodily injury or disease (both possibly of a deadly character) to *(a)* his stock of domesticated animals; or *(b)* to his vegetable plantations; or *(c)* to wild animals in the preservation of which he is interested; or *(d)* wild plants in the preservation of which he is interested.

The body of this report deals with the last of these five groups, which is divided into four sub-groups. The animals discussed are mostly insects which have been submitted to the British Museum with questions as to their identification and the means to be employed for their control. These inquiries are answered as far as possible, and the operations in controlling insects are dealt with at length, especially the hydrocyanic acid fumigation for dwellings, mills, greenhouses, etc.

Part II deals with the correspondence and reports already referred to. Suggestions are given as to the control of many interesting economic pests. There are also lists of economic insects sent by the Imperial Department of Agriculture for the West Indies.

This is a valuable book both on account of its unique arrangement and of the matter it contains, and it is to be hoped that succeeding volumes will follow in due course.

Cacao in Grenada.

The Acting Agricultural Instructor, Grenada, reports:—

The cacao crop in the lowlands is rather late this season, a result, no doubt, of the rainy season beingquite a month later than usual. On the other hand, in the mountains the trees are doing very well indeed. The crop promises to be a heavy one.

DEPARTMENT NEWS.

Mr. L. Lewton-Brain, B.A., F.L.S., Lecturer in Agriculture on the staff of the Imperial Department of Agriculture, proceeded to St. Vincent in R.M.S. Solent on September 28, and paid an official visit to the Agricultural School from September 30 to October 3.

Mr. Henry Powell, Curator of the Botanic Station at St. Vincent, returned to that island in R.M.S. Solent on September 29. As stated on p. 301 of this volume, Mr. Powell has been making a study of the cotton industry in St. Kitt's, Antigua, and Montserrat.

THE TRAINING OF ECONOMIC BOTANISTS.

The following interesting note on the training of economic Botanists at Kew is taken from *Nature* of August 27:—

On more than one occasion it has been pointed out in these columns that the study of economic botany is neglected by our universities and colleges. But though educational authorities have failed to make provision for students and research in economic botany, Kew has long been a training school from which men have been sent to all parts of the world, and a centre of expert advice on vegetable products. For thirty years or more a course of lectures on economic botany, intended to prepare men for service in India and the colonies, has been given in the museums of the Royal Botanic Gardens, Kew; and the course by Mr. J. M. Hillier, just finished, was attended by twenty gardeners in training. It is desirable that the study of vegetable economics should be encouraged in great commercial centres such as Glasgow, Liverpool and Belfast, as suggested by Professor Bower in an address referred to in *Nature* of December 18, 1902 (Vol. lxvii, p. 165); but it must not be forgotten that, while universities and educational authorities have practically ignored the subject, Kew has been steadily training practical botanists and investigators for Botanic Gardens and other establishments at home and abroad. As a result there is scarcely a Botanic Garden in India and the colonies which has not on its staff one or more men trained at Kew or recommended by the Director of the Royal Gardens. Kew affords facilities for scientific and technical training in botany unequalled by any other institution, and it is satisfactory to know that so many members of the staff of our Botanic Gardens have been trained there.

Human labour in Cotton Growing.

The following extract is taken from the *Encyclopædia Britannica,* Vol. XXV, p. 219:—

Expert estimates place the amount of human labour at about 54 per cent. of the whole cost of growing cotton. This is a much higher ratio of the cost of labour than is found in many other industries. It exceeds the cost of labour in corn and wheat growing and also in manufacturing industries.

Mr. J. R. Bovell has kindly made a similar calculation of the ratio of the cost of labour in sugar growing in Barbados and places it at 55 to 60 per cent

GLEANINGS.

At the last meeting of the Jamaica Board of Agriculture it was decided that a fairly large quantity of dried cassava pulp should be sent to glucose manufacturers in England for valuation as a source of glucose.

The *Montserrat Herald*, of September 19, states that several shipments of Sea Island cotton have been made from Gages estate with satisfactory results. The proportion of lint was from 29 to 30 per cent. of seed-cotton.

The damage done to the Botanic Gardens in Jamaica has been estimated by the Director at £225. The Board of Agriculture has recommended that an additional grant be made for the purpose of restoring the gardens to good order as soon as possible.

The *Sugar Planters' Journal* of September 12, has the following :—

There has been a decided decrease during the last few months in the quantity of beet sugar exported from Germany to England, the loss amounting for the first quarter of 1902 to almost 63,000 long tons in raw sugar alone.

According to the *India Rubber World* of September 1, the total amount of gutta-percha imported into Great Britain—the largest consumer of this material—during 1902 was 15,334 cwt. Of this, 3,394 cwt. were from the British West Indies and 7,860 cwt. from British Guiana.

Mr. William M. Smith, Acting Agricultural Instructor, Grenada, writes: 'At a meeting of the Grenada Agricultural Society held at York House on September 11, to which the commercial section of the community was invited, it was decided that the two interests should be combined in one society to be called "The Grenada Agricultural and Commercial Society."'

According to the Jamaica *Daily Telegraph*, of September 22, 150 barrels of Jamaica oranges were sold at auction at \$5·25 to \$5·62½ per barrel during the week ending September 12. This is an excellent price for the fruit.

Cocoa-nuts are reported very firm again this week. Jamaicas are selling at \$27 to \$30 per 1,000, the latter in a small way mostly.

Acting upon the recent resolution of the Board of Education, lots of land are being cleared in every parish of the colony for the purpose of establishing agricultural plots for the use of school children. These plots are to be fenced round and exclusively used by the school children, who will carry out experiments and put their knowledge to practical use. (*Federalist and Grenada People*, September 17.)

According to the *Chamber of Commerce Journal*, there has been a great increase in the value of the products of Sierra Leone exported in 1902. The principal products are palm kernels, palm oil, kola nuts and rubber. The value of palm kernels and palm oil has increased about 25 per cent., while the value of the total exports, exclusive of specie, which was £256,284 in 1901, has increased to £316,966.

We learn from the *Botanical Gazette* for September that the new tropical laboratory, of which mention has been made in the *Agricultural News* (Vol. II, p. 302), will be under the direction of Dr. C. J. J. Van Hall, who has been appointed Inspector of Agriculture for the Dutch West Indies. Dr. Van Hall has been Botanist at the Phytopathological Laboratory at Amsterdam.

The *Federalist and Grenada People*, of September 10, states: 'Cotton cultivation is likely to be taken up seriously in this island. To stimulate the production of cotton, Mr. L. R. Mitchell proposes to set up a gin in buildings on the Careenage, where the cotton will be cleaned and put in bales at reasonable rates. We hope it will be fully appreciated, and the gin, when erected, kept busy throughout the entire cotton season.'

A plant has been erected in British Guiana for the manufacture of 'Banana Coffee.' The supply of this article, which will, for the present at any rate, be limited, will be entirely absorbed by the New York market, where a company has been formed to handle this and other banana products. Mr. A. F. Spawn, the manufacturer, claims that he has produced a perfect substitute for coffee, free from caffein, the active principle of coffee.

The Brazilian coffee crop for the year ended June 30, is in excess of the expectations entertained in regard to it twelve months ago, and the quantity compares favourably with the crop of former years, excepting, of course, that of 1901-2, when production was on an enormous scale, and passed all previous totals. In the season just ended in Rio and Santos, receipts amounted to 12,325,000 bags, or more than five million bags above the original estimate. (*Indian Planting and Gardening*, August 22.)

A small box of English fruits was recently sent to the Imperial Commissioner of Agriculture by the Secretary of the Royal Horticultural Society of England, for the purpose of testing a new process of packing fruit. The experiment was not altogether a success. The apples, some pears and a bulb were the only articles that arrived in good condition; but in fairness to the patentee it should be stated that he was of opinion that the rest of the fruit was put up too ripe.

A correspondent writes as follows in *The Southern Planter* for September :—

There are so few genuine Poland China hogs in the South that the Southern farmer has never been really awakened to its merits as a money maker. The Poland China is undoutedly the easiest hog to fatten that we have, and consequently, the most profitable. They are good for lard, and equally as good for bacon. To those who have thoroughly tested the bacon of the different breeds of pure-bred swine, the fact must be evident that the bacon of the Poland China hog is excelled by none. The Poland China has no superior as a grazer, and at the same time he is quiet; not restless and roguish like some.

EDUCATIONAL.

Leeward Islands.

The *Leeward Islands Gazette* of September 3, contains the Rules and Regulations of the Educational Department, made by the Governor-in-Council on April 3, 1903. The regulations relating to agricultural instruction are as follows :—

A grant of £1 or £2 will be made to the teacher of each school in which efficient instruction in subjects bearing on agriculture is given in accordance with the provisions of the Education Code in force.

In order to earn a grant the Inspector of Schools must be satisfied that the work has been continuous throughout the year, that all the instruction as required by the Code has been given and that the subject has been taught experimentally, that is, the pupils of all standards above the 4th. have been trained in box or pot culture, and the lessons to the standards below the 5th. have been illustrated by suitable diagrams and actual specimens. But no grant will be made in any case unless there is evidence that the teaching of the subject has aroused an intelligent interest in the minds of the pupils.

The Inspector of Schools will supply, out of the sum voted for the purpose of agricultural instruction, the necessary materials for box or pot culture.

A limited number of school gardens will be established in each Presidency and a further grant of £1 or £2 will be made to the teacher of the school to which the garden is attached, if the Inspector of Schools is satisfied that the character of the work done merits a grant. The course of work in the school garden will include the laying out of beds, the raising of plants, transplanting, the care and culture of garden crops, grafting and budding. In the case of schools, the gardens of which are not attached to Botanic Stations, or are not under the direction of officers of the Imperial Department of Agriculture, the course of work laid down in 'Hints for School Gardens,' No 11 of the Pamphlet Series published by the Imperial Department of Agriculture, must be followed.

No Grant will be made on account of a school garden unless there is a proper title to the land, and unless the ground is properly fenced and there is a sufficient water supply.

The Inspector of Schools will supply the tools necessary for the working of the authorized school gardens and such tools shall be and remain the property of the Government.

Applications for admission on the list of schools authorized to establish gardens must be made to the Inspector of Schools not later than March 1, in each year.

Agricultural Scholarships.

The following notice has been issued by the Imperial Department of Agriculture for the West Indies :—

Notice is hereby given that the Imperial Department of Agriculture for the West Indies is prepared to offer, tenable at Harrison College, Barbados, two scholarships of the annual value of £75, one for the Leeward Islands and one for the Windward Islands, for competition by boys not over seventeen years of age—the sons of Managers of estates, Proprietors, or others—who intend to take up agriculture, and whose parents are in receipt of an annual income of not more than £200.

The scholarship is to be tenable for one year from the date of election, but renewable at the end of that period on satisfactory reports from the Head Master of Harrison College. In any case, the scholarship must be vacated at the end of any term in which a scholar attains the age of nineteen years.

In the election of candidates, the Imperial Commissioner of Agriculture will take into consideration not merely the report of the Examiners, but also any circumstances, which, in his opinion, may guide him to secure best the object for which this scholarship is granted.

The subjects for examination for the above scholarships are :—

A. Compulsory :—
  1. Writing from Dictation ;
  2. Arithmetic, up to vulgar fractions inclusive ;
  3. Latin grammar ; and
  4. At the Candidate's option, either Greek accidence or French grammar, and easy translation.

B. Optional :—(one or more)
  1. Geometry—1st. Book of Euclid ;
  2. Algebra—up to end of Simple Equations ;
  3. Chemistry—Elements : Hydrogen, Oxygen, Carbon, the Halogens and Sulphur with their more important compounds and the chemical laws and principles illustrated by them ; the Laws of Boyle, Gay-Lussac and Avogadro ;
  4. Botany—Elementary structure and physiology of plants. *Hooker's Primer of Botany ;* and the characters of the higher divisions and classes of the Vegetable Kingdom.

The examination will be held locally, as required, beginning on December 1 next.

Applications, with certificates of age and other particulars, must be sent in on or before November 1 next to the Administrator or Colonial Secretary of the colony in which the boy resides.

BALATA.

The *Pharmaceutical Journal* of September 5, publishes the following note relating to experiments with balata :—

It has been supposed that the balata tree of Demerara is not the same as that of Trinidad, but Hart finds no difference in the two kinds when cultivated in Trinidad, although trees of the same species vary considerably in the forests. Balata is exported from Trinidad and Venezuela, and realizes about 2*s.* 6*d.* per ℔. *(Report Botanical Garden, Trinidad.)* Attempts have been made to ascertain if balata could be obtained from the leaves. Professor E. Jungfleisch, of Paris, obtained from the leaves, in 1896, about 4 per cent. of balata, and Professor H. P. Wijsman, of Leyden, 5 per cent., but recent experiments made at Haarlem by Professor Greshoff gave a yield of only 1·7 per cent. In 1901 C. Mannich, of Berlin, obtained from the leaves by extraction with chloroform 5 per cent. of a product insoluble in alcohol, but it did not possess the good qualities of balata. Dr. Greshoff has, therefore, come to the conclusion that it will not pay to extract balata from the dried leaves in Europe, on account of the freight, nor in South America, on account of the expense of the necessary chemicals.—*(De Ind. Mercuur.)*

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

Mr. J. R. Jackson, A.L.S., contributes the following notes on the state of the London Spice and Drug Market during the month of August:—

The month of August has brought but little or no change in the state of the markets indicated in our last notes (*Agricultural News*, Vol. II, p. 302)—certainly none for the better. Not only were the drug and spice sales reported dull at the beginning of the month, but they continued to get worse as the month advanced; a state of things felt indeed in every branch of trade, and not at all likely to be improved by the unfortunate summer and the holiday season combined.

With regard to West Indian products, the chief interest has been centred on the Sugar Convention, and at the time of writing, early in September, its effects upon different branches of trade, in which sugar directly or indirectly plays a part, are being discussed in the daily press. This, together with the hurricane, with which Jamaica has been visited, has brought the West Indies very promiently to notice, though in the drug and spice markets West Indian products have commanded but little or no attention.

GINGER, NUTMEGS, MACE, AND PIMENTO.

At the spice auctions on August 12, 181 barrels of Jamaica were offered, 60 of which sold at 52*s.* to 56*s.* for good, fair washed at 46*s.*, and dull to medium washed at 39*s.* to 43*s.* Of 90 cases of Cochin offered, 9 were sold at 43*s.* 6*d.* for very wormy selected, medium and bold cut were bought in at 57*s.* 6*d.*, small to bold medium at 55*s.*, and unsorted native cut at 52*s.* 6*d.* At this sale 143 bags limed Japanese were bought in at 27*s.* to 28*s.*, and 19 bags Bengal sold at 36*s.* for good, and 28*s.* for fair small. Very little demand was experienced for any of the kinds at the later sales of the month, and the figures remained pretty much the same as in the above quotation.

At the same sale, 110 packages of West Indian nutmegs were sold at the following prices: 60's at 2*s.* 6*d.*, 68's at 2*s.*; 100's to 106's at 11*d.*, and downwards to 6*d.* for 160's. Neither Penang, Singapore nor East Indian, all of which descriptions were offered, secured a purchaser. At the last sale of the month, namely, on the 26th., the prices stood thus for West Indian, of which 170 packages were offered and nearly all sold: 68's, 2*s.*; 71's to 72's, 1*s.* 8*d.* to 1*s.* 10*d.*; 75's, 1*s.* 8*d.*; 84's to 85's, 1*s.* 5*d.* to 1*s.* 6*d.*

The prices of mace had, at the early part of the month, advanced somewhat over those of the preceding month, 34 packages of West Indian selling at 2*s.* 4*d.* for good bold, 2*s.* 1*d.* to 2*s.* 3*d.* for fair to good pale, 1*s.* 8*d.* to 1*s.* 10*d.* for broken, and 1*s.* 11*d.* to 2*s.* for ordinary red.

Pimento, which sold on the 12th. at 2⅜*d.* per ℔. showed an upward tendency a week later owing to the cyclone in Jamaica, and good sales were effected from 2⅞*d.* to 3*d.* per ℔. for fair quality. At the close of the month the article was still firm at 3*d.*, 50 bags being sold out of 129 offered.

SARSAPARILLA.

At the first drug sale on August 6, four bales of fair grey Jamaica were sold at 1*s.* 1*d.* to 1*s.* 2*d.*, a few bales of second quality fetching 1*s.*, and sea damaged 11½*d.* Twenty-four bales of Lima-Jamaica were offered, five of which were sold at 9*d.* to 10*d.* for country damaged; 1*s.* being asked for fair sound. Three bales of native red were sold at 9*d.* to 10*d.* for slightly damaged dull to fair red; a fortnight later the figures stood as follows: Grey Jamaica, fair sound, 1*s.* 2*d.*, and coarse damaged, 1*s.*; sound Lima-Jamaica was limited at 1*s.*, while sea damaged met with buyers at 8½*d.*

TAMARINDS AND ARROWROOT.

At the sale on August 19, Antigua tamarinds sold at from 6*s.* 6*d.* to 7*s.*, and on the 26th. ordinary dry and strong Antigua sold in bond at 8*s.* 6*d.* per cwt. At this sale 850 barrels of St. Vincent arrowroot were offered, of which about half were sold at 2*d.* for good manufacturing, one lot fetching 2½*d.* The quotations for Bermuda were 1*s.* 3*d.*, 1*s.* 5*d.*, 1*s*, 7*d.*, and 2*s.* 2*d.* per ℔., according to quality.

KOLA.

This interesting drug was reported at the drug sales, on August 6, as very scarce; one half-barrel being offered of good bright West Indian halves which realized 6*d.* per ℔. On the 20th. four barrels fair natural West Indian realized 5½*d.*, and fresh 2½*d.* per ℔.; and on the 27th. good dry West Indian sold at 5¾*d.*, and fine green at 10*d.* per ℔.

LIME JUICE.

Lime juice, which at the beginning of the month was quoted at 1*s.* 4*d.* per gallon, had declined at the end to 1*s.* 3*d.* for good raw West Indian.

RUBBER IN TRINIDAD.

The following account of experiments with rubber in Trinidad is taken from the *West India Committee Circular* of September 14:—

We learn from Mr. J. H. Hart, of the Botanical Department in Trinidad, that a series of experiments is being carried out at the Experiment Station in that island, with a view of testing, in the most thorough manner, the suitability of the various kinds of rubber-producing plants for cultivation under the conditions prevailing in the different West Indian Islands. *Hevea* or Para rubber, *Castilloa* or Central American rubber, *Funtumia* or West African rubber, are having special attention. With regard to the first, Mr. Hart considers it to be proved fully suitable for general cultivation, and rubber of excellent quality has been produced from trees at the Trinidad station. The experiments with *Castilloa* go to show that the rubber from young trees contains too large a quantity of resinous matter, making it necessary for the planter to wait for eight or ten years before marketable produce is obtainable. *Funtumia elastica*, which affords the Iré or silk rubber of the West Coast of Africa, has been found to give a marketable product at the early age of four and a half years, and the latex has been found specially easy to coagulate as it responds quickly to simple evaporation of the water contained in the latex, and gives a very high percentage of fine elastic material. The chemical examination of the latices of these rubbers, is in the hands of the officers of the Analytical Department of the Imperial Institute, and it is expected that interesting details will shortly be forthcoming from that Institution. We learn that the merits of the last mentioned rubber have already excited considerable interest, and that on several estates extensive preparations are being made for its cultivation. Mr. Hart informs us that the trees at the Government Experiment Station are now bearing fine crops of seed annually, which can be obtained in season (April to July) at reasonable rates on application at the offices of the Botanical Department. The seeds of this rubber possess, it is said, far greater vitality than those of either *Hevea* or *Castilloa*, and can be sent long distances by post with safety.

MARKET REPORTS.

London,—September 15, 1903.—Messrs. Hales Caird & Co., Messrs. E. A. de Pass & Co., Messrs. Kearton, Piper & Co.; 'The West India Committee Circular,' September 14; 'The Liverpool Cotton Association Weekly Circular,' September 11; and 'The Public Ledger,' September 5, 1903.

Aloes—Curaçoa, 14/- to 35/-; Barbados, 13/- to 35/- per cwt.

Arrowroot—St. Vincent, 1¾*d.* to 4*d.* per ℔. Bermuda, 1/3 to 1/6 per ℔.

Balata—1/11½ to 2/- per ℔.

Bees'-wax—£7 10*s.* to £7 17*s.* 6*d.* per cwt.

Cacao—Trinidad, 59/- to 72/- per cwt.; Jamaica, 49/- to 58/- per cwt.; Grenada, 51/- to 61/- per cwt.; Dominica, 50/- to 56/6 per cwt.; St. Lucia, 50/- to 56/- per cwt.; Demerara, 55/- to 64/- per cwt.

Cardamoms—Mysore, 1/4 to 3/- per ℔.

Coffee—Jamaica, 32/- to 71/- per cwt.

Copra—Trinidad, £15 5*s.* to £15 10*s.* per ton, c.i.f.

Cotton—West Indian, 6*d.* to 6½*d.* per ℔.

Fruit—

Bananas—7/- to 8/- per bunch.

Oranges—Jamaica, 9/6 to 13/6 per case.

Pines—Floridas, 1/6 to 2/6 each.

Fustic—£3 10*s.* to £4 per ton.

Ginger—Jamaica, 37/- to 60/- per cwt.

Honey—Jamaica, 18/6 to 22/ per cwt.

Isinglass—West Indian lump, 2/3 to 2/11; cake, 1/4 to 1/6 per ℔.

Kola Nuts—4*d.* to 7*d.* per ℔.

Lime Juice—Raw, 10*d.* to 1/2 per gallon; Concentrated, £14 10*s.* to £15 per pipe. Distilled Oil, 1/6; Hand pressed, 3/- to 3/3 per ℔.

Logwood—£4 2*s.* 6*d.* to £5. Roots, £4 to £4 10*s.* per ton.

Mace—1/10 to 2/4 per ℔.

Nitrate of Soda—Agricultural, £9 12*s.* 6*d.* per ton.

Nutmegs—75's to 70's, 1/8 to 1/10; 90's to 80's, 1/2 to 1/6 per ℔.

Pimento—3½*d.* to 3⅞*d.* per ℔.

Rum—Demerara, 8*d.* to 11*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.

Sarsaparilla—Jamaica, 1/- to 1/2.

Sugar—Muscovado, 11/- to 13/6; Crystallized, 15/3 to 16/6 per cwt., Molasses, 13/- to 15/- per cwt.

Sulphate of Ammonia—£12 6*s.* 3*d.* per ton.

Tamarinds—Antigua, 6/6 to 7/- per cwt.

Halifax, N.S.,—August 27, 1903.—'The Maritime Merchant.'

Bananas,—No quotations. Supply poor.

Ginger—Jamaica, 24c. pure bulk.

Hay—$12·00 to $14·00 per ton.

Molasses,—Porto Rico, 43c. to 44c.; Barbados, 39c. to 40c.; Antigua, 33c. to 35c.; Trinidad, 44c. to 45c.

Nutmegs—50c. to 60c.

Oranges,—Jamaica, $7·00 per barrel.

Pine-apples—$1·50 to $2·25 per dozen.

Potatos—New, 50c. to 60c. per bushel.

St. John, N.B.,—September 8, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 42c. to 44c.; Barbados, 38c. to 40c. per gallon.

New York,—September 18, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.

Cacao—African, 12½c. to 13c.; Caracas, 13c. to 14c.; Jamaica, 10c. to 12c.; Grenada, 12¾c. to 13c.; Trinidad, 12¾c. to 14c. per ℔.

Cocoa-nuts—Trinidads, $22·00 to $24·00; Jamaicas, $27·00 per M.

Coffee—Jamaica, fair to good ordinary, 5c. to 5¾c. per ℔.; Manchester grades, 7½c. to 10c. per ℔.

Ginger—Jamaica, 7½c. to 8¼c. per ℔.

Goat Skins—Jamaicas, 50c. to 53½c. per ℔.

Onions—$1·40 per crate; $2·75 per barrel.

Pimento—7¼c. to 7½c. per ℔. ex store.

Rubber—Nicaragua scrap, 74½c. to 75½c.; Guayaquil strip, 65c. to 66c. per ℔.

Sugar—Muscovados, 89°, 3⅜c.; Centrifugals, 96°, 3⅞c.; Molasses, 89°, 3⅛c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—September 26, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·75 per 100 ℔.

Cacao—$14·00 per 100 ℔.

Cocoa-nuts—$13·00 per M. (Husked nuts.)

Coffee—Jamaica, $7·50 to $8·50; ordinary Rio, $9·00 per 100 ℔.

Hay—New Brunswick, 80c. to $1·00 per 100 ℔.

Manures—Nitrate of soda, $57·00 to $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00 per ton.

Molasses—No quotations.

Onions—Madeira, $2·00 to $3·50 per 100 ℔.

Potatos, English—$4·25 to $4·75 per 160 ℔.

Rice—Ballam, $4·85 per bag (100 ℔.); Patna $3·50 per 100 ℔.; Rangoon, $2·60 to $2·80 per 100 ℔.

Sugar—No quotations.

British Guiana,—September 24, 1903.—Messrs. Weiting & Richter.

Arrowroot—St Vincent, $9·50 per barrel.

Balata—40c. to 42c. per ℔.

Cacao—Native, 11c. to 12c. per ℔.

Cassava—84c. per barrel.

Cocoa-nuts—$8·00 to $10·00 per M.

Coffee—Rio and Jamaica, 10½c. to 11c. per ℔. (retail); —Creole, 10c. to 11c. per ℔.

Dhal—$3·50 to $3·75 per bag of 168 ℔.

Eddoes—$1·08 per barrel.

Molasses—Vacuum Pan yellow, 16c. per gallon, casks included.

Onions—3½c. to 4c. per ℔.

Pea Nuts—Curaçoa, 3¾c.; American, 5c. per ℔. (retail).

Plantains—20c. to 36c. per bunch.

Potatos, English—$3·50 to $3·75 per barrel.

Rice—Ballam, $4·60 to $4·65 per 177 ℔. ex store; Patna and Seeta, $5·65 per 177 ℔. —Creole Rice, No quotations.

Sweet Potatos—Barbados, $1·08; Creole, $1·20 per barrel.

Tannias—$2·40 per bag.

Yams—White, $2·40 per bag.

Sugar—Dark Crystals, $2·02½ to $2·04; Yellow, $2·20 to $2·30; White, $3·50; Molasses, $1·70 to $1·90 per 100 ℔.

Timber—Greenheart 32c. to 55c. per cubic foot.

Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—September 25, 1903.—Messrs. Edgar Tripp & Co.

Cacao—Ordinary, $13·50 to $15·75; Estates, $14·25 to $14·50 per fanega.

Onions—$1·90 per 100 ℔.

Potatos, English—$2·00 per 100 ℔.

Rice—Yellow, $4·50 to $4·65; White Table, $5·65 to $5·90 per bag.

Sugar—Refined, $4·50 to $6.00 per 100 lb.

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[46.]

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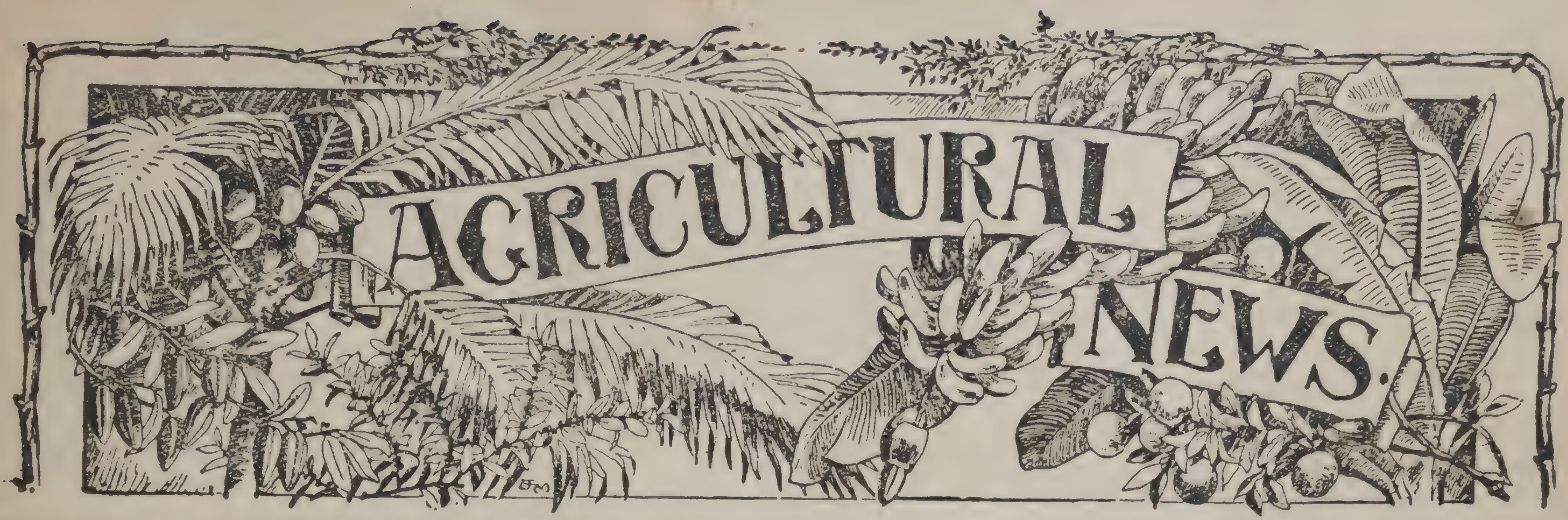

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The Conservation of Soil Moisture.

ONE of the most important factors in the growth of plants is the supply of moisture; maximum crops can only be obtained when there is an adequate supply. This is the common experience of planters, especially in tropical countries, subject to long periods of drought. In many countries remedy is sought in irrigation; but where irrigation is impossible, the planters must rely upon cultivation as a means of controlling and economizing the water supply.

In the first place attention must be given to increasing the storage capacity of the soil for moisture. The soil should be got into such condition that it will be able to soak up and hold the greatest possible amount of water, compatible with a well-drained and healthy state. Now the water-holding capacity of a soil is chiefly regulated by its fineness. That is to say, the finer the texture of the soil, the greater its storage capacity. One of the objects of soil cultivation, therefore, is to pulverize the soil with a view to enabling it to hold more water. The same object is also attained by increasing the proportion of humus in the soil. This method is especially suitable for light sandy soils, such as are so frequently met with in the West Indies. Humus, being of a porous, spongy nature, is able to soak up and hold a large amount of water; it is calculated that 1 lb. of dry humus is capable of holding 1½ lb. of water. The importance of adding to the supply of humus in the soil by burying manure, trash, weeds, etc., and of preventing its waste through bush-fires and the like, is therefore obvious.

The influence of soil cultivation upon the water supply is also evident in the opening up of the surface soil to admit the rain. It is necessary that the soil which has become hardened and caked during drought or by trampling in crop time, should be loosened, as far as possible, before the rainy season sets in. Otherwise it is apt to suffer from washing, and much of the water flows off the hard surface instead of being absorbed in the soil.

The surface soil loses moisture in three ways,—by downward percolation, by evaporation, and by the transpiration of plants. To guard against such loss is a problem of special importance in tropical agriculture.

Loss by percolation is naturally greatest in loose, sandy soils. Here again comes in the use of humus. The drought-resistant power of such soils can be improved by ploughing in manure or a crop of cow pea or other leguminous plant. The use of heavy rollers is sometimes resorted to for the purpose of compacting such soils.

In preventing loss of water by evaporation from the surface of the soil, wind-breaks exercise a strong protective influence. As the result of experiments, King states in his *Irrigation and Drainage* that 'the drying effect of the wind at 300 feet was 30 per cent. greater than at 20 feet, and 7 per cent. greater than at 150 feet from the hedge.'

Soils are also kept moist in a time of drought by the use of mulches. The mulch may take the form of a loose layer of soil on the surface or of a covering of vegetable matter, such as stable manure, cane trash, grass, etc. In the former case the object is attained by 'surface cultivation'. This is most readily carried out by means of a shallow cultivator which loosens the soil to a depth of 3 or 4 inches. The operation must be repeated frequently with a view to keeping this surface layer in a loose condition. The upward movement of water by capillary attraction is thereby arrested, and since the water is prevented from reaching the surface, there can be very little loss by evaporation.

Experiments were conducted by King in which a plot was kept cultivated to the depth of 3 inches, while a similar adjacent plot was uncultivated. It was found that there was a daily loss of water on the cultivated land equivalent to 14½ tons per acre, while on the uncultivated land this amounted to 17½ tons. The experiment was continued for forty-nine days, and during that time, water equivalent to 1·7 inches of rain was saved by cultivation.

It must be understood that it is impossible to lay down hard and fast rules with regard to the cultivation of the soil. The method to be adopted will depend largely upon the crops that are being grown, the climate, locality and various other 'local' conditions. Attention was drawn to this in a paper read by the Hon'ble Francis Watts at the Agricultural Conference held at Barbados in 1901 (*West Indian Bulletin*, Vol. II., p. 96), in which it was suggested that, possibly, the best kind of treatment for 'orchard' soils was to leave the soil uncultivated except for the cutting back of grass and weeds. Mr. Watts further recommended the trial of leguminous crops as a cover to the soil, especially on hill slopes.

For further information on this aspect of the question, readers are referred to a paper in the *West Indian Bulletin*, Vol. IV., p. 176.

SUGAR INDUSTRY.

Sugar-cane Experiments in Jamaica.

The following report on sugar-cane experiments, conducted at Cinnamon Hill, Jamaica, by Mr. Joseph Shore, is taken from the *Bulletin of the Department of Agriculture* for August.

Mr. H. H. Cousins, M.A., F.C.S., the Government Analytical and Agricultural Chemist, writes the following introduction to the report:—

> Mr. Shore has recorded the yields of cane from the varieties grown at Cinnamon Hill as ratoons; the canes were irrigated and gave five times the average yield of the non-irrigable lands of the estate which suffered severely from the unprecedented drought. D. 116, D. 51, and D. 102 have done well as ratoons. These experiments indicate that some of the seedlings are decidedly superior to the estate canes under irrigation conditions.

REPORT ON EXPERIMENT CANES AT CINNAMON HILL, AS FIRST RATOONS.

Name.	Tons per acre 1902.	Tons per acre 1903.
D. 51	62	55·9
D. 116	62	49
D. 102	42·5	47·1
Otaheite	41	43·5
Canaan	70·5	43·4
D. 275	43·5	43·2
D. 103	32·3	42
D. 343	49·3	37·3
C. Queen	42·3	35·8
D. 119	52	34
D. 80	25·8	31
D. 95	37	30·5
D. 115	47·2	29·5
D. 128	33	29·1
D. 117	35·6	28·1
D. 109	45	24
D. 147	34	22·6
Red Rose R.	32·5	21·7

These canes were cut as plants on August 21, 1902, and again as first ratoons on June 15, 1903, only ten months old. This could not be helped as the estate's crop was finished and some alterations were to be made in the works later.

This juice stood only 6·6 Beaumé average, owing largely to a fall of 16·25 inches of rain in May—an exceptional fall for this district. The rainfall for the ten months was 47·53 inches but was unequally distributed, the first four months of 1903 being very dry. Irrigation was used during that time, so that the growth was kept up.

The extraction of juice by mill was 67 per cent. against 65 per cent. last year; and the average extraction from estate's canes for the crop was 67 per cent., by the same mill.

The return from the small area of ordinary canes, that could be spared water, was 25 tons per acre. This shows the value of irrigation in a dry year such as 1902-3 was, when the average return per acre from non-irrigated canes was 9 tons.

D. 102, D. 103, D. 80 and Otaheite have done better as first ratoons than as plants.

Sugar-cane Experiments in Madeira.

In the *Consular Report on the trade of Madeira for 1902*, reference is made to the progress of the experiments with new varieties of sugar-cane. Some of the new seedling canes, such as B. 208 and B. 147, were imported from Barbados with a view of changing the varieties in the island. Good results have been obtained with the Yuba or Uba cane imported from Natal, which has been found to resist the fungoid diseases which have attacked other canes. We take the following extract from the report:—

The entire cane crop of the island last year was roughly estimated at 21,000 tons, valued at £57,000, of which amount 6,000 tons were converted into sugar and the remainder into cane spirit for local consumption. All the cane turned into sugar was manufactured by Maudet's diffusion process, and the results obtained surpassed the manufacturer's expectations. The manufactory in question is, I am told, the only cane factory in the world where this process has been tried, and by it the saccharine matter in the cane is almost entirely extracted, and the manufacturing expenses also considerably reduced.

Exhaustive experiments were made by the 'Maudet' process for extracting the sugar which is contained in the 'megasse' or cane waste. This process has been tried with excellent results in beet factories, but had never before been attempted with cane. The 'Maudet' patent consists in the diffusion of the megasse by means of a forced circulation. The cane is crushed in the ordinary manner and the megasse, which still contains a large amount of sugar which cannot be extracted by mill power, is then sent into a battery of diffusors and very nearly all the sugar is drawn by means of a centrifugal pump which sucks the sweetened water from the bottom of a diffusor and forces it through a special heater and thence to the top of the same diffusor. The juice is not only sterilized by being brought to boiling point but is also clarified at the same time. The difference between this and the ordinary diffusion plant is that the cane is not cut into chips but crushed, and that the megasse loses none of its properties as fuel. The battery also instead of consisting, proportionally, of twelve to fourteen diffusors need only consist of eight or nine. By Maudet's process the juice likewise attains a higher density than by the ordinary process of manufacture.

COTTON.

The Cultivation of Cotton in Barbados.

We take the following extracts from a letter by Dr. E. Graham Pilgrim, of Buenos Ayres, which appeared in the *Agricultural Reporter* of October 16. It will be seen that Dr. Pilgrim lays great stress upon the necessity of preventing the exhaustion of the land by the export of cotton seed. Various ways, in which the seed can be utilized locally, are mentioned. Provided that the seed is not shipped and the oil-meal is fed to stock and so returned to the soil, cotton will not be found to be an exhaustive crop:—

What are the facts, so far, as to cotton? Our soil and climate specially fit us to grow a fine and long Sea Island fibre of high quality and demand, fetching even 1s. per ℔. in English markets. By the aid of judicious artificial manures, less expensive than those for cane, we should be able to grow some 300 ℔. of lint and 650 ℔. of seed, per acre, on fair soils, not hopelessly exhausted of humus, and favoured by our average rainfall, which, compared with other countries, is very good. The cultivation, from start to finish, needs ample human labour, that is scarce and dear with most of our competitors, but very cheap and abundant with us. Our port is at our doors; our roads are good; delivery to factory and shipboard costs us less than cartage, even to the nearest railway, costs them. Our soil is rich in phosphates; and cotton would be an admirable rotation crop, and last of all we have uses for the very seed itself which give it a value to us, on the spot, far transcending anything that can be got out of it elsewhere. This is worthy of a special digression.

To export the seed from Barbados would be an economic heresy and scandal. It will be more that twice the weight of the lint, and will sell for a song, carrying our soil's vitality with it, and much other value besides. A ton of it should give a ½ ton of hulls, 250 to 300 ℔. of good oil, and more than ⅓ ton of prime cake or meal. The hulls can be sold as bran for cattle, or burnt in place of our very dear fuel, leaving an ash rich in phosphates and potash, and therefore readily saleable. The poorest oil is a cheap basis of soap, and the good oil would sell well to our people in various edible forms, and it is worthy of remark that a cheap fat is sorely needed in Barbados, as a complementary balance-ration to the cod, molasses and potato. As to the meal there is more than ample demand for it on the spot. It is a stock-food of considerable nitrogenous value, and it has the greatest manurial value of any known stock-food. It should almost wholly replace the linseed oil-meal now imported into Barbados, and much also of the corn. Here again, as a balance-ration to the potato and worst class molasses, it would be unrivalled. There is ample demand for it at good prices. We are using oil-meal at nearly double the price at which we sell our sugar itself, and even corn at this same or greater. As mere manure, even, cotton-seed meal is worth not far short of $20 per ton.

It should here be added that cotton is not an exhausting crop, relatively, and the soil of Barbados is already so exhausted that this is a very important point in its favour. Although its seed is of intense richness, there is not much of it, and the entire crop, leaves, stems, pods, lint and seed is a light one. Crops of canes and tops, of 25 to 50 tons per acre, or even potatos, 18 to 12 tons, or corn in average total, far surpass it in soil exhaustion.

WEST INDIAN FRUIT.

THE TRANSPORT OF BARBADOS BANANAS.

The following are extracts from a report by Mr. G. Sebert Evelyn to the Superintendent, Botanic Station, Barbados. Mr. Evelyn went to England on the R.M.S. *Atrato,* which left Barbados on August 30, in order to make observations as to the state of the fruit during the voyage, and to ascertain the methods to be adopted for securing the arrival of the fruit in the best condition. Mr. Evelyn has also forwarded a table of readings of the maximum and minimum thermometer and the wet and dry bulb thermometer, taken in the hold three times each day :—

On August 31, I took the temperature of the lower deck at 6.15 a.m., at noon and at 5.15 p.m., and continued at these stated hours until my arrival on September 9; the readings were taken at the earliest and latest time for seeing without resorting to a lamp.

I consider the arrangements for the fruit on the *Atrato* to be good, and no trouble was spared by the officers of the ship to ensure the arrival of the bananas in good condition. The three hatchways remained open for the whole voyage, and in each hatchway there was a windsail; the cool air passed from the after deck through a door on to the bananas stowed in No. 5 deck, combined with the cool air from the starboard and port hatches, and after thorough circulation, was drawn out by a steam fan placed forward of the deck.

On September 2, I examined two double crates and one single; on September 4, one double and two singles, and on September 7, two doubles and one single. On each occasion I found the bananas in a perfectly sound condition and quite green. One crate was packed without cotton wool and the fruit, although still green, did not have the bright appearance of those wrapped in cotton wool.

On September 10, the day after our arrival at Plymouth, I saw the arrangements made by Mr. Langman, Messrs. Pink and Son's manager, for receiving the bananas. The lighter comes alongside the quay and the crates are lifted just across the street, about 30 feet wide, to the stores where the crates are opened and the fruit examined. I saw about 100 crates handled in this way, which took several hours. Most of the bunches were of a lovely green, a few yellow yet still hard, and some entirely spoiled ; in a few of the double crates we found one bunch perfectly green and sound, and the other rotten, this shows at once that the fault lies in the bad bunch being picked over ripe.

Arriving at Portsmouth, I was [met by Mr. Frank Pink with whom I had several interviews ; he is very keen over the Barbados banana which he considers far superior to either the Jamaica or the Canary Islands. I was shown over his establishment and got many hints as to the handling and hanging of the fruit to prevent any possible bruises.

It is my intention to visit, with Mr. Frank Pink, the Manager of the Royal Mail Company.

TROPICAL FRUIT IN ENGLAND.

The following article which appeared in the Glasgow *Herald* of September 12, is taken from the Demerara *Daily Chronicle,* of October 7. The writer gives an interesting account of the present position of the tropical fruit trade :—

The home fruit crop has proved a comparative failure this year owing to the wretched weather experienced in the United Kingdom during the past summer, but it does not appear that the scarcity or otherwise of home-grown fruits materially affects the consumption of the tropical article. With respect to oranges, at the present time the Australian and Jamaican fruits are the leading lines in Great Britain. Jamaicans are making from 11*s.* 6*d.* to 12*s.* 6*d.* a case, and are said to be very good. For the week ended September 12, some 1,233 cases were unshipped from Jamaica, compared with 1,001 from Spain and 569 from South Australia. As to banana consumption in the United Kingdom, this trade seems to belong to a category by itself. The banana business, we are told, is a complete puzzle to the wholesale trader. The fruit is making headway in the most persistent manner. The larger the supply the greater does the demand appear to be. At the present time the Jamaica bananas are making from 4*s.* 6*d.* to 7*s.* 6*d.* a bunch, and the Canary from 8*s.* 6*d.* to 14*s.* For the week ended September 11, the arrivals at all British ports were 16,194 bunches from Jamaica for Bristol, 18,878 for London from Canary, and 28,390 for Liverpool, also from the latter centre. From these figures it is clear that London has lost its supremacy as the chief port for bananas. The provincial cities are more than holding their own at present, from which it is concluded that the banana has acquired a foothold in the larger towns of the midlands, the west and the north, and that as the fruit becomes better known, it is being more keenly appreciated by the British consumer. Evidently the market for the banana is a growing one in the United Kingdom, and there are no indications that it is likely to decline in value to the fruit-growers of tropical and sub-tropical latitudes.

FEEDING MILCH COWS.

An animal is supplied with food (1) for the production of heat and energy, and (2) for the repair of the wear and tear on the body tissues. When the requirements of the animal have been supplied, so far as these two functions are concerned, any surplus food is stored up either as fat or as milk. It is necessary, therefore, in the feeding of dairy stock, that care be taken that the food is of such a nature as to be favourable to the production of milk.

The nature of the food requirements of a milch cow are best ascertained by a consideration of the composition of milk. While there is considerable variation in the proportion of the constituents of milk—variations due to peculiarities of the cow as to the breed, time since calving, feeding, etc.—100 ℔. of cow's milk usually contain about 87 ℔. of water, 4 ℔. of fat, 3½ ℔. of albuminoids, 5 ℔. of sugar and nearly ½ ℔. of ash or mineral matter. From these figures it will be seen that milk is a highly nitrogenous substance, and on that account the best results will only be obtained when the cow receives a nitrogenous diet.

Although it must be remembered that the breed and individuality of the cow are more important factors in the production of milk than food, and that it is impossible to make a good cow out of a bad one even by the best feeding, yet a good cow will not do her best unless she is well and properly fed. Not only must a cow receive sufficient food if she is to give a maximum yield, but further, the food must be properly compounded, so as to contain the correct proportions of food nutrients. While, however, the quantity of milk is materially influenced by the diet, the nature of the feeding is not found to affect the quality or composition of the milk to any great extent. Thus there has always been a general impression that milk becomes more watery when the cows receive succulent food. As the result of many experiments it is now usually agreed that such foods do not cause the quality of the milk to deteriorate. A more important point is the possibility of increasing the proportion of fat to the other solids in milk by a system of feeding, and it has been asserted from time to time that the percentage of fat could be raised by feeding with palm-nut seed and other oleaginous foods. The evidence in support of such assertions is, however, very conflicting, and there seems to be no definite proof on this point. On the other hand, there is evidence that while feeding has little or no effect on the amount of the various milk constituents, the nature and character of the constituents themselves can be influenced by the nature of the food. This is particularly the case with the fat, and it has an important bearing on the question of butter making. Thus, it is generally agreed that cotton-seed meal makes a hard butter.

It will thus be seen that, to get the best results with dairy cows, careful attention must be given to the feeding. The diet must be liberal and at the same time so balanced as to have a high proportion of nitrogenous to non-nitrogenous matter. Just as an animal, that is working hard, requires a nitrogenous diet to enable it to renew the waste of tissue, so the dairy cow, which is daily producing a large quantity of a highly nitrogenous substance, must receive the food constituents from which the milk is to be made. This consideration has led some feeders to make the mistake of feeding too concentrated a diet. It is found that the presence in the diet of a certain proportion of coarse fodder, grass, hay, etc., is necessary to bring about the distension of the stomach, without which there cannot be proper and complete digestion.

PLANT BREEDING TO SECURE RESISTANT FORMS.

The following paper was read by Dr. E. M. Wilcox, Professor of Biology at the Alabama Polytechnic Institute, at the Sixteenth Annual Convention of the Association of American Agricultural Colleges and Experiment Stations. Dr. Wilcox indicates the lines upon which very useful work might be conducted :—

The present very brief paper is not designed to detail the results of investigations made by the author, but rather to call special attention to a very profitable field of investigation that might very properly be taken up by station botanists. The field is one that offers results of purely scientific and theoretical interest, and at the same time the results may in a large measure help to solve the problem of combating some of the most troublesome diseases where other measures are either not practicable or too expensive.

Prof. H. Marshall Ward, as a result of a study of certain rusts, having various species of the genus *Bromus* as host plants, has, by negative evidence largely, added some very interesting evidence to favour the belief that resistant varieties may be secured in the manner indicated in the title of this paper. He says, in conclusion to his extremely valuable paper, 'The importance of all this is, I think, that it justifies the hopes of those who believe that the constitution of plants can be so modified by breeding and selection that disease-resisting varieties should be no more difficult to evolve than varieties which refuse to cross with the pollen of certain other forms.'

The application of any known fungicides to field crops is out of the question from a practical standpoint, and yet certain of these widely cultivated crops are subject to fungus attacks that annually reduce the profits by millions of dollars. Of course all those fungi attacking field crops, that are reached by seed treatment, form exceptions to the above statements. Notable among these are to be named the smuts of certain cereals, the preventives for which have become classic in the literature of the subject, but the rusts of the cereals yield to no such treatment as this, and yet they are among our most destructive and widely distributed diseases and annually cause much loss.

So far as I know, these rusts of the cereals were the first diseases to call attention to the necessity of attacking plant diseases along the line of selected resistant forms for planting wherever possible. The work in the selection of resistant varieties of the cereals has made some progress in Australia and the United States, but the work is only started in the case of the general problem, and the results are by no means so certain as some would have us think, and are attained only as a result of a long-continued series of experiments. The cause is greatly injured by the widespread publishing of what may be simply an accidental resistance as an established fact.

My contention is simply that work of this sort may well be undertaken by the station botanist in connexion with other work in plant breeding, and not so much as an independent piece of work. Many of these resistant forms are going to be discovered accidentally by mere field observation of the different varieties toward various diseases. Such was the case in the discovery, made by my immediate predecessor, Mr. Earle, of the resistance of the Herbemont grape and some others of that class toward the 'root-rot' fungus, that annually does much damage to grapes in the South. My purpose has been accomplished if some of you take greater interest in this line of investigation as a result of this statement.

DESTRUCTION OF THE LOVE VINE.

A leaflet has recently been issued by the Botanical Department at Trinidad, giving information as to the habits of the Love Vine *(Cuscuta* sp.) together with directions for its eradication. The following is a summary of the information given:—

This plant is a true parasite, able to affix itself to various kinds of plants and live entirely upon the sap, or vital fluids, of the trees or shrubs upon which it grows.

The parasite reproduces itself freely by seed and by division, small portions being able to attach themselves very readily to suitable plants.

If allowed to seed, it rapidly spreads through a district. The seed ripens very quickly, and is distributed by various means. The flowers may be seen in small greenish rosettes covering the vine when fully developed.

Cuscuta attacks and destroys various trees and shrubs, and often does considerable damage to cacao estates once it establishes itself.

As the plant is most widely distributed by seed, special care should be taken to destroy it before seeds can ripen. Where plants are attacked, it is necessary to go over them regularly at stated periods, removing all parts of the parasite and burning or burying the material at once. Burying is as effective as burning, since the plant cannot exist except on other plants, having no roots of its own.

In removing the parasite the work must be thorough, and not even the smallest portion should be left. The spot should be visited at intervals of not more than seven days, and every remnant that can be seen removed. If left for longer intervals without attention, the remnant will grow and gather strength, and owing to the first disturbance, the parasite becomes more widely distributed than at first.

BUSH FIRES.

A committee of the Agricultural Society of Trinidad was recently appointed to draw up recommendations for the simplification of the existing law on the subject of bush fires. The following are the chief proposals of the committee:—

That the provisions, requiring a trace of 25 feet to be cleared of all inflammable matter, should be complied with, before any licence to set fire is granted by the Warden.

That, where the Warden has not personally inspected the land to which fires are to be set, the certificate should be signed by a neighbouring householder or landowner, or by the person appointed by the Warden to inspect the land, and should be delivered to the Warden before he grants the licence.

That twenty-four hours' notice should be given to the police and adjoining landowners before fire is set.

That in seasons of exceptional dryness, the Warden should be empowered to employ such additional assistance as may enable him to comply with the provisions referring to the inspection of fire traces before granting licences.

SCIENCE NOTES.

The Jack-fruit Tree.

The Jack-fruit *(Artocarpus integrifolia)* is a large tree of East Indian origin, closely related to the bread-fruit *(Artocarpus incisa).* It is common throughout the West Indies, where, as in the East, its fruit is much esteemed among the natives.

The large, collective fruit is, like the pine-apple, made up of an aggregation of fruits (fig. 32). It varies in size from 12 to 18 inches and sometimes weighs as much as 60 ℔. The individual fruits, which are known as flakes, consist of a seed enveloped in a sticky, pulpy mass having a strong odour. The number of these flakes varies from fifty to eighty. Though much appreciated by the natives, this fruit is rarely eaten by Europeans on account of its unpleasant odour.

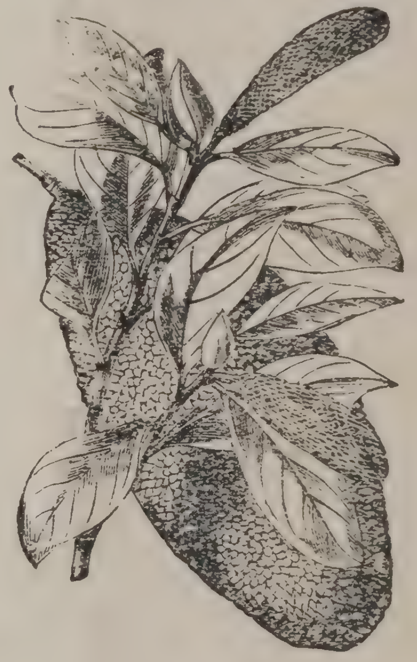

Fig. 32. Artocarpus integrifolia.

Showing fruit and leaves. [From *Kew Guide.*]

'The seed when roasted, is eaten as an article of food, and is said to resemble chestnuts. A writer in the *Indian Agriculturist* says: "I believe it contains a very large percentage of starch, and as such could be utilized in a variety of forms. If these seeds be taken to weigh ⅓ oz. each, one fruit will give us 30 oz. of flour, and twenty fruits, the produce of one tree, 600 oz., or 37 ℔. of flour."' (Watts in *Dictionary of Economic Products of India.*)

The Jack-fruit yields a valuable, fairly hard timber much used for making furniture.

The heartwood is of a light, yellowish colour when freshly cut, but darkens considerably on exposure. It possesses a beautiful grain and is capable of taking a high polish.

The wood also yields a yellowish colouring matter used for dyeing clothes. From the bark, a dark gum is obtained; while the juice of the fruit yields a caoutchouc-like substance.

The tree affords excellent shade for stock in pastures, and is recommended by some as a suitable shade tree for coffee, but this favourable opinion is not uniformly held.

SCIENTIFIC RESEARCH AND AGRICULTURE.

We take the following extracts from the report, as published in *Nature* of August 27, of a lecture given at the University Extension Meeting at Oxford by Professor R. Meldola, F.R.S. The subject of the lecture was 'The Relation between Scientific Research and Chemical Industry.' It will be seen that Professor Meldola laid special stress upon the work of scientists for agriculture:—

The next illustration which I propose to make use of refers to the application of chemistry to agriculture. The elements which are most likely to fail, and which, in fact, have generally to be supplied, are potassium, phosphorus and nitrogen, excepting, of course, in the case of those particular leguminous plants which have developed a special means of fixing atmospheric nitrogen. Chemistry having thus been called upon to supply the agriculturist with compounds containing potassium, phosphorus and nitrogen, the first development, which may be ascribed to Liebig's influence, is the Stassfurt salt industry in Prussia, where immense deposits of salts containing potassium were known to exist. Similar deposits are found in Anhalt. The mining of these salts was commenced in 1860, and has proved an immense source of wealth to Germany, the total value of the Stassfurt and Anhalt salts produced down to 1890 being estimated at £11,500,000, and since that time the output has gone on increasing from year to year. It is not necessary to weary you with statistics, but it is important to note how the demand for potassium salts for agricultural purposes has given rise to a great industry, for the natural salts, consisting chiefly of carnallite, a double chloride of potassium and magnesium, and kainite, a double sulphate of potassium and magnesium with magnesium chloride, have to be submitted to various processes in order to separate the constituents, and the Stassfurt salt factories are now supplying Germany, as well as exporting large quantities of potassium chloride and sulphate, magnesium chloride and sulphate, potassium carbonate, caustic potash, etc.

In a similar way the demand for phosphates has given rise to the utilization of every available source of these compounds. Calcium phosphate is found as the mineral apatite, a double calcium phosphate and chloride or fluoride, occurring in vast deposits in America, and also in a less definite form in Canada, the West Indies, France, Belgium and Germany. In this country calcium phosphate occurs in the form of coprolites, supposed to be the excreta of extinct saurians, in Cambridgeshire and elsewhere. All these natural phosphatic mineral deposits are mined, and have become valuable assets to the countries possessing them. The conversion of the minerals into a form suitable for the nutrition of crops is a branch of chemical industry involving the use of sulphuric acid for the conversion of the natural phosphate into the more easily assimilable form known as superphosphate. The greater part of the world's output of natural phosphate finds its way to Germany to undergo this treatment, the annual consumption of artificial manure in that country being estimated at something more than two million tons at a cost of about £5,000,000. The mineral portion of the bones of animals, as you are no doubt aware, also consists largely of calcium phosphate, and before the mining of the mineral phosphates the conversion of bone ash into superphosphate was carried out on a very large scale. Bone ash is supplied now in immense quantities from South America, but not much is converted into superphosphate, as the bones, after removal of the fat and the size (for glue), are capable of being finely ground, and are available for manure in this form. Here is surely a romance of chemistry! The phosphates contained in the vegetation of the South American pampas go to build up the bony framework of the cattle which graze thereon. The skeletons of these beasts ultimately supply, let us say, the growing crop of a beet sugar manufacturer in Germany with phosphates. The phosphates, picked out of the soil by South American vegetation, concentrate in the bones of cattle, and are then sent into circulation in German beet. Or, even more striking, the phosphates accumulated by the great lizards of a remote geological age are now circulating through growing crops. This circulation of matter through the intervention of the living organism is an every-day story to the chemist.

The deposits of sea birds also contain phosphates derived from the fish upon which they feed, and these deposits often accumulate in such large quantities as to make them available for agricultural purposes. Under the name of guano, immense quantities of this material, which contains both phosphates and nitrogenous matter, are exported from Peru. There is subject-matter for philosophizing here, also, about the circulation of phosphates from marine organisms through birds into growing crops, and so forth, but time will not admit of many side disquisitions, if I am to keep to my text. As another source of phosphate, it is of interest to know that the basic slag, obtained in the Thomas-Gilchrist process of making steel, is now largely used, so that the work set going by Liebig has, among its latest developments, led to the utilization of a waste product of the steel industry.

Excepting in the case of leguminous plants, which are capable of utilizing atmospheric nitrogen by a process which it does not come within my province to explain, the ordinary source of nitrogen for growing plants is a soluble nitrate, and if the soil is poor in such salts, they must be supplied either directly or indirectly through salts of ammonia, which are converted into nitrates in the soil by bacterial action in a way that nobody is better able to explain to you than Professor Warrington. The great natural deposits of sodium nitrate, which occur in Chili and Peru, supply practically all the nitrogen applied to the soil in this form for fertilizing purposes. With respect to ammonia, the destructive distillation of coal for the manufacture of gas and tar products, or for the production of coke, furnishes practically all the salts of this base required for agricultural and other purposes.

There has been no straining of facts on my part in this sketch—necessarily brief—of the industrial results of Liebig's work. The establishment of the fundamental truths was a piece of pure scientific research. Had it not been known by the irrefragable proofs furnished by scientific method that such and such elements were essential for plant growth, the mineral resources of the earth would have remained unused for this purpose. The minute percentage of nitrogen, locked up in the fossilized vegetation of the Carboniferous period, would never have been isolated in the form of ammonia and applied to the soil for the nourishment of the crops raised by the present day agriculturist. The successful cultivation of the beet as a source of sugar has been made possible by this knowledge, and it may be of interest to add that the further scientific study of the cultivation of that root in Germany has led to the yield of sugar being increased from $5\frac{3}{4}$ to 13 per cent. during the period commencing about the year 1840 and ending at the present time. The economic result of this industry upon our own sugar-growing colonies is a fiscal question which does not come within the province of this address.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 351 of this issue.

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NOTES AND COMMENTS.

The Trade and Agriculture of Turks Islands.

From the *Annual Report* of the Commissioner of the Turks and Caicos Islands for 1902, we learn that the value of the exports for the year was £32,553. About two-thirds of this amount represents the value of the salt shipped, 1,656,730 bushels, most of which went to the United States.

The only other important product is sisal fibre. During the year 498,334 ℔. valued at £7,100 were shipped. This is an increase of 37,000 ℔. over the exports of 1901. Of the total, 289,725 ℔. went to the United States, 164,000 ℔. to England and 44,609 ℔. to Canada. The prices obtained for the fibre throughout the year were steady and profitable. The value of the sponges shipped was £11,961. A small quantity of cotton was also exported.

Vanilla Cultivation in Mauritius.

A committee was recently appointed in Mauritius to make recommendations for the amendment of the laws on vanilla. In the report of this committee it is stated that 'vanilla grows luxuriantly in Mauritius and constitutes an important source of revenue. There is practically no disease on fully grown plants. The failures in certain plantations are mostly due to bad cultivation. For some years, however, the plants have been attacked by fungi, which sometimes destroy a whole plantation in a short time. The flowers have a great enemy in the common green bug which damages large numbers of buds. These are however easily caught by hand.'

There are some 3,000 vanilla planters in Mauritius, but the majority of these are small proprietors who have a few plants in their gardens or orchards. The exports of prepared vanilla amounted, in 1902, to 7,712 ℔. The cultivation is capable of considerable extension.

In spite of care taken to save the pods, they are subject to the depredation of thieves whom, owing to the nature of the product, it is very difficult to detect. With a view, therefore, to protecting the planters, it is recommended that stringent regulations be made for the licensing of all sellers and preparers of vanilla, the affixing of a special mark by vanilla growers on their green pods, and the giving of notice to the authorities before vanilla is gathered.

The committee further recommends that a special Inspector be appointed for the purpose of inspecting and reporting on all vanilla plantations, preparing houses, etc.

The Resources of the Philippines.

In the *Sugar Planters' Journal*, of September 19 and 26, is published the report of an address delivered before the Trans-Mississippi Commercial Congress by the Hon. Truman G. Palmer, on the 'Resources of the Philippines.'

Of the 73,000,000 acres of land in the Philippines, 40,000,000 acres are in virgin timber. With the exception of a little less than 5,000,000 acres, all the land belongs to the Government to dispose of as it pleases. The wealth of the Philippines lies in her forests and her agriculture. The Forestry Bureau already reports the discovery of between 600 and 700 species of timber, including twelve species of cabinet woods, many of them unknown in any other portion of the globe, dye woods, gum trees, gutta-percha and rubber.

There are vast forests of both gutta-percha and rubber trees; the wasteful process of gathering the sap by ringing the trees prevails.

Manila hemp affords the greatest return for effort expended of any product of the islands. Natives make $4 to $5 a day in gathering the wild product, while the profits are doubled when the plant is put under cultivation. From 44,137 tons in 1877, the exportations have risen to 108,264 tons valued at $16,019,438, forming 75 per cent. of the agricultural exports.

With regard to coffee, experts declare that many localities produce a berry equal to the Mocha. The superiority of the Philippine coffee is shown by the fact that 12½ cents per ℔. were obtained for it, when Brazilian coffee was selling for about 6 cents. The industry was practically ruined some years ago by the ravages of a borer. The Department of Agriculture has established a station at Manila and several sub-stations, where instruction is being given to the natives by skilled agriculturists in the methods of fighting pests and in other agricultural matters.

A large trade is also done in copra, $1,000,000 being the value of that exported during last year.

Northern Fruits in Costa Rica.

An article in *Der Tropenpflanzer*, for September 1903, gives an interesting account of fruits cultivated in Costa Rica. The peach grows very well; it flourishes best at a height of 5,000 feet. This applies both to the Chinese and Persian varieties. The European plums do not grow well; the American forms have not yet been tried as such, but are often used as supports and *Prunus chicasa* has then been grown; they grow well but do not appear to bear. The Japanese plums *(Pr. triflora, Pr. hattan)* thrive best and bear fruit; the hybrid between *Pr. chicasa* and *Pr. triflora* ('Gold' of Luther Burbank) appears to thrive even better. No other stone fruits have hitherto done well.

Apples grow very curiously; they start to grow well, but make almost upright, parallel shoots, with flowers at the end; a few fruits are formed at the ends of these shoots, but they are not worth cultivating. Pears do not thrive, not even the Chinese varieties.

The grape vine (*Vitis vinifera*) is found everywhere, but it seldom bears well; this is due in part to neglect and to deficiency of manure, but it is evident that in the capital, at a height of 3,600 feet, there is not sufficient heat for the vine to develop and ripen its fruit. American grape vines have only recently been imported; it is probable that two of these—*Vitis cordifolia* and *V. vulpina (rotundifolia)*—will thrive well.

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Andropogon Oils in Ceylon.

In the annual report of the Controller of the Experiment Station, Peradeniya, published in the *Agricultural Journal of the Royal Botanic Gardens, Ceylon*, an account is given of the cultivation in Ceylon of various species of *Andropogon* for the sake of the essential oils obtained from them.

The genus *Andropogon* is represented by twenty species in Ceylon and several are noted for the essential oil they contain. Only citronella *(Andropogon nardus)* has, up to the present, been cultivated to any extent in Ceylon, though other species are frequently found.

An experiment was conducted with citronella for the purpose of ascertaining whether the grass would grow well at the elevation of the Station, its cultivation having been confined to the low-country districts. The plants grew remarkably well and the first crop was available in five months. It is thus proved that citronella can be grown at an elevation of 2,000 feet with a rainfall of about 87 inches per annum. Further experiments are being undertaken with a view to testing the yield of oil under varying conditions of distillation, climate and cultivation.

Efforts are being made to obtain, for trial at the Station, a number of species, including *A. Schoenanthus*, *A. citratus* and *A. Adoratus.*

At the last West Indian Agricultural Conference, a paper was read by Mr. J. H. Hart, of Trinidad, on 'The preparation of essential oils in the West Indies'. The fourteen samples of oils exhibited, which were made from material grown at the Botanic Gardens, Trinidad included specimens of citronella from *Andropogon nardus* and lemon grass oil from *A. Schoenanthus.*

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Shade Trees.

Mr. B. J. Kluvers recently published in *De Nieuwe Gids*, a paper entitled 'Schaduw en Cultures,' a summary of which is given in the *Revue des Cultures Coloniales.* The paper, which deals with the question of shade for cacao, pepper, *Castilloa*, tea and cinchona, was originally read at a meeting of coffee planters held at Melang, on February 28, 1903.

A good shade tree possesses the following characteristics:—*(a)* easy propagation, either from seeds or cuttings; *(b)* rapid growth; *(c)* quick formation of the crown, which should not be too dense and should allow free access of air and light; *(d)* wood soft but not brittle, easily cut but resistant to wind; *(e)* evergreen or remaining without leaves for only a short time; *(f)* strong main root, lateral roots relatively less developed; this will give good anchorage without encroaching on the roots of the shaded plants; *(g)* improvement of soil, by nodules of leguminous plants; *(h)* freedom from diseases.

The 'dadap serep' *(Erythrina lithosperma)*, which has been used for some time, is for a long period without leaves, is subject to diseases, and does not develop easily in long-cultivated soil. The 'dadap solo' (a variety introduced from Solo) is only superior in that it grows more readily, but it is subject to the same diseases and is easily uprooted by the wind.

Among useful shade trees the following may be mentioned:—(1) Sengon laut *(Albizzia moluccana)*, (2) Sengon djawa *(Albizzia stipulata)*, (3) *Peltophorum* (Caesalpinia) *dasyrachis*, (4) Regenbom *(Pithecolobium Saman).*

The 'sengon laut' is easily propagated, has a rapid growth, gives much shade, is only deprived of its leaves for a short time and improves the soil. On the other hand, the wood is easily broken by the wind, the tree is subject to the attacks of a boring larva, and only lives from twelve to twenty years.

The 'sengon djawa' is more resistant to wind than the 'sengon laut' and lives longer, but it does not develop so quickly and remains without leaves for a longer time.

The *Peltophorum dasyrachis* has not been tried, yet, to any great extent.

The rain tree *(Pithecolobium Saman)*, known also in the West Indies as Saman or Guango, has of late attracted much attention. Mr. Hart, the Superintendent of the Botanic Garden, Trinidad, strongly recommends it, but, according to Dr. Preuss, opinions differ widely concerning it in Venezuela, where it is used considerably. In Java, the tree appears to develop too much in breadth both above and in the soil, but it answers all other requirements of a shade tree very well. It is of most use in very dry and windy regions.

It is very desirable that planters should experiment with different shade trees and publish the results fo their experiences.

INSECT NOTES.

A Natural Enemy of the Sugar-cane Beetle.

In a paper by Mr. W. W. Froggatt, F.L.S., published in the *New South Wales Agricultural Gazette,* and reprinted in the *Hawaiian Planters' Monthly,* for May 1902, an account is given of parasitic wasps which have been found to destroy a considerable number of the sugar-cane beetle grubs. The following extracts from this paper are of interest:—

This parasitic wasp *(Scolia formosa)* belongs to a group of the great order *Hymenoptera* (containing the bees, ants and wasps). The *Scolidae* are large powerful wasps, either black, or black and yellow, more or less banded with yellow bars or blotches, often thickly covered with hairs, and provided with powerful digging legs adapted to their burrowing habits. The female wasp, when ready to lay her eggs, hunts over the ground until she detects some grub underneath; there she burrows down through the soil to the grub she is in search of, which is immediately stung and thus reduced to insensibility, but not killed. This single egg is deposited upon the under surface of the beetle grub, the mother wasp working her way out again, but never placing more than one egg upon a grub.

As soon as the young wasp is hatched, it forces its head through the skin of the grub and sucks up its juice, feeding upon the helpless grub, but not killing it. As the wasp increases in size, the beetle grub wastes away until nothing is left but the skin, and by this time the larval wasp is fully grown and ready to spin a stout oval silken cocoon in which to pupate, the perfect wasp emerging in the following summer.

There is in Barbados one of these wasps *(Scolia dorsata),* but nothing seems to be known of its habits. This insect may also be parasitic upon some of the destructive pests.

The Use of Poisons as Insecticides.

There is much mis-apprehension on the part of many persons as to the effect of poisons, used as insecticides, on those eating fruits or vegetables that have been sprayed, or on animals that may eat hay or grass, grown in orchards where spraying has been carried on.

Many interesting experiments have been carried out in order to test this point, and the results have always indicated that their is no danger under ordinary circumstances. Grass growing under apple trees, that have been sprayed, has been cut and fed to sheep and cows; and in one case the grass was even well drenched with the poisonous mixture and then cut at once and fed to stock without any injurious effects being noticed. The explanation of this, is that the amount of poison in a dilute mixture is so very small that larger animals such as sheep and cows would not get enough to injure them; while an insect is generally killed if it eats even a minute particle of the poison.

Vegetables and fruits should not be sprayed with poison within two weeks of the time they are to be eaten, and 'fuzzy' and soft-skinned fruits, like the peach, should remain on the tree at least four weeks after the application of poison. The poisons here referred to are the stomach poisons such as Paris green, London purple, lead arsenate, etc. Contact poisons would have even less injurious effect, and in addition, would generally be so distasteful that stock would refuse to eat anything covered with them. Many fruits and grains are now fumigated with hydrocyanic gas and with carbon bisulphide. These are very volatile, and if the materials treated are not wet, a few hours would suffice to drive off all the poisonous gasses.

Cotton Caterpillar.

The following note on this cotton pest and the method of combating it has been communicated by Mr. W. N. Sands, Curator of the Botanic Station at Antigua:—

A serious attack of the cotton caterpillar *(Aletia argillacea)* has made its appearance in the cotton cultivations at Antigua. In one case a whole field of cotton has been stripped. The pest is being fought by dusting infected plants with Paris green mixed with finely powdered lime, the mixture being applied by means of a small Osnaburg bag fixed to the end of a short stick. This method so far appears to act more effectively than spraying. Already 100 ℔. of Paris green have been distributed and dusting is being energetically carried on.

This insect has also appeared in large numbers in Montserrat, St. Kitt's-Nevis and Barbados. A modification of the method of dealing with the pest adopted by Mr. Sands was recommended by the Department for trial in these islands and it has already given very good results in Barbados. (See *Agricultural News,* Vol. II, p. 330.)

NUTMEG CRACKING MACHINE.

The following note on a machine in use in Grenada, for cracking nutmegs has been communicated by Mr. W. M. Smith, acting Agricultural Instructor:—

I visited Gouyave estate some time ago and examined a new nutmeg cracking machine. This machine has been invented by Mr. John Rudder, a native of Barbados. It consists of a long, high, narrow box, within which revolves a wooden wheel, the rim of which is as wide as the box and is formed of a series of wide deep sockets. The nutmegs, which are fed to the machine from a funnel-shaped box at the top, drop into these sockets, and as the wheel is revolved, are dashed against the end of the machine. The force with which they strike causes the nuts to crack, and the kernels and shells drop together through an aperture at the bottom. The whole construction is of wood (white pine), and the price they are sold for here is £12 10*s.* each. This machine has been used in Grenada, for the last nine months, by most of the largest shippers in the island. The nuts can be cracked at the rate of a barrel in two minutes. Several shippers, who have been using this machine, have returned to cracking by hand. They report that the nutmegs cracked by this machine turn a dark colour, from the oil rising to the skin of the kernel, causing them to lose their former good prices in the London market. On the other hand, very satisfactory reports have been made to me by many others. The manager of Gouyave estate, where more than 600 barrels of nutmegs out of shell are shipped annually, reports that he could not do without this machine.

DEPARTMENTAL REPORTS
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DOMINICA: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL AND CACAO EXPERIMENT PLOTS, 1902-3.

Botanic Station: The report deals with the working of the Station during the year ended March 31, 1903. Several new buildings were erected during the year. Various improvements were effected in the grounds and a large number of interesting species added to the collection.

No less than 57,131 plants were distributed from the Station during the year, in addition to large numbers of seeds, cuttings, etc. Much useful information is given in the report upon economic plants growing in the gardens.

The report throughout is of an interesting and satisfactory character and affords evidence of the earnest manner in which Mr. Jones is carrying out his duties.

Agricultural School: The report of the officer-in-charge of the Agricultural School gives an account of the work that has been done in this institution during the year. There were twenty boys in residence. In addition to their ordinary school work, the boys are engaged in cultivating experiment plots of ground provisions, fodder crops, vanilla, onions, tobacco, etc. Instruction is also given in the preparation of produce for market, and a very successful shipment of vanilla, cured at the school, was made during the year.

The live-stock kept at the school include two stallions, a donkey stallion, a Shropshire ram, a Poland China boar and various breeds of poultry.

Cacao Experiment Plots: The report of the Agricultural Instructor deals with the working of the nine experiment plots in the country districts. A detailed account is given of the treatment on each plot as well as of the cost, yield, etc.

Mr. Branch also held meetings in different districts and visited the holdings of peasant proprietors for the purpose of giving instruction. Special attention was given to the improvement of the methods of curing cacao and the introduction of sweating boxes.

ST. KITTS-NEVIS: REPORTS ON THE BOTANIC STATION AND AGRICULTURAL EDUCATION, 1902-3.

Botanic Station: Of special interest is Mr. Lunt's account of the experiment in growing tobacco, to which reference has already been made in the *Agricultural News* (Vol. II, p. 291).

The Curator also had charge of the sugar-cane experiments, which were continued as heretofore, but with the addition of six extra manurial experiments. There were in all 562 experiment plots, 244 with manures and 328 with varieties.

Agricultural Education: The Head Master of the Grammar School reports that there were seven scholars holding agricultural scholarships. They have been regular in attendance and are keenly interested in their agricultural studies. Instruction is given by the Agricultural and Science Master provided by the Imperial Department of Agriculture.

Mr. Belling commenced during the year a course of monthly lectures to teachers in elementary schools.

EDUCATIONAL.

Barbados.

We have received the *Reports, etc., of the Educational Department, Barbados, for 1902.* The reports deal with (1) elementary, (2) second grade, and (3) first grade education. We make the following extracts relating to agricultural education.

With reference to elementary education, the reports state:—

> Comparatively new schedules, setting forth the scope required in Object Lessons and Nature Teaching, were issued during the year to teachers for the examinations to he held in 1903. The teachers have taken up the subject of agriculture very keenly, and have endeavoured to interest their pupils in it.
>
> Previous to this year, three courses of lectures were given in Bridgetown to elementary school teachers. In addition to this aid, Sir Daniel Morris, K.C.M.G., this year wrote to the Board to ask them to arrange for further lectures at central points in the island with a view to extending the information that had already been given. As a result of this communication, a course consisting of six lectures was given at each of four centres—Bridgetown, St. Philip, St. Thomas and St. Peter. The Board greatly appreciate all that is done by the Imperial Department, as with the funds at their disposal, they would be unable to do it themselves. Dr. Longfield Smith, who was the lecturer at each of these centres, made his subject most interesting and instructive.
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> The Agricultural Department has assisted us substantially, by giving prizes for practical agricultural work done by elementary school children, and also by providing lectures in elementary science, so that every schoolmaster and his assistant may have the opportunity of learning some elementary science, and of seeing how best to impart to their pupils what they learn. That the interest taken in our educational system by Sir Daniel Morris and his staff is fully appreciated is evident from the eagerness with which the lectures are attended by the teachers, and by the number of exhibits at the local exhibition.

The reports of the examiners on the work of the Harrison College candidates in Natural Science and Agricultural Science have already been published in the *Agricultural News* (Vol. II, p. 106).

The Head Master of Harrison College makes the following reference in his report to the importance of agricultural education:—

> By the liberality of the Imperial Department of Agriculture, Agricultural Science is grafted on to the rest of the Science curriculum, and forms indeed the most important part thereof; for it is madness to shut our eyes to the fact that for the future we must avail ourselves of the discoveries of science, and that agriculture must be pursued scientifically, otherwise the out-look will be gloomy indeed. I should like to draw the attention of parents of boys, who are destined to carry on the most important industry of the island, to the offer of Sir Daniel Morris to provide a few exhibitions for the assistance of boys in their training as scientific agriculturists. These exhibitions more than cover the whole College fee, leaving in fact enough to pay for the necessary books, etc. It is difficult to believe that parents will be so short-sighted as not to avail themselves of so liberal and advantageous an offer.

GLEANINGS.

According to the New York *Times*, the first bale of Porto Rican cotton exported for four decades was shipped September 9, on the Red D. Line S. S. *Caracas*. It was consigned to a Porto Rican firm in New York.

The Secretary of State for the Colonies has selected Mr. A. W. Bartlett, B.A., B.Sc., F.L.S., for appointment as Superintendent of the Botanic Gardens in British Guiana. Mr. Bartlett was expected to leave England on October 14 by R.M.S. *Orinoco*.

Nine hundred and ninety-one tons of molasses were imported into Madeira from the West Indies and Demerara during the past year. They are employed in the manufacture of neutral spirit for the treatment of Madeira wines. *(Consular Report on the Trade of Madeira for 1902.)*

In the annual report of the Comptroller of Customs, British Guiana, it is stated that the quantity of rum exported from the colony during last year was 4,278,638 proof gallons, valued at $651,218·87. But while the quantity continues to increase, the total value shows a decline as compared with previous years.

A correspondent, writing in the Jamaica *Gleaner* of September 26, points out that the recent hurricane has been the cause of a pimento 'boom.' As a result of the destruction of the crop in St. Ann's, prices were considerably advanced in the other pimento-growing parishes. Before the hurricane the price of this product was 14*s*., while at the time of writing 23*s*. were being paid per 100 ℔.

According to the *Voice of St. Lucia* of October 1, Mr. C. W. Meaden, the Superintendent of the Trinidad Government Stock Farm, had with him on board the *Ocamo* some magnificent horned and feathered stock selected from the best strains of the Dominion, for the Government Farm. A Hereford and a Holstein bull were very fine specimens of those breeds. There were, besides, Cochins, Wyandottes, Bantams, turkeys, geese, Belgian hares, and a couple of very fine rams.

According to the *Journal of the Society of Arts* of September 25, the machines used for extracting olive oil in Spain are of the most primitive description. The olives are first crushed in a mill turned by a horse or a bullock. They are then placed in lever presses and the oil thus extracted, boiling water being used in the process. It is said that there are between 3,000 and 4,000 of these wooden presses in Spain. Formerly the remaining pulp was used as fodder or fuel, but now it is sold and a second extraction made. There are sixty-three mills in Spain for extracting oil from this pulp.

Mr. W. N. Sands, Curator of the Botanic Station, Antigua, writes as follows of the Thatch palm *(Thrinax radiata)* in Barbuda :—'This is found in large quantities in one district. The plants remain dwarfed, possibly owing to the sandy soil in which they grow, or possibly to the young leaves being constantly cut and made up into rough brooms, which are sent to Antigua and the neighbouring islands.'

Maize is the greatest of all fattening foods for live stock, but, as is well known, it will make a badly balanced ration, being deficient in protein, and consequently not suited as a sole ration for growing animals. We must therefore balance the maize ration with some food having a much higher protein content, and containing less of carbohydrates and fat. *(Agricultural Gazette of New South Wales.)*

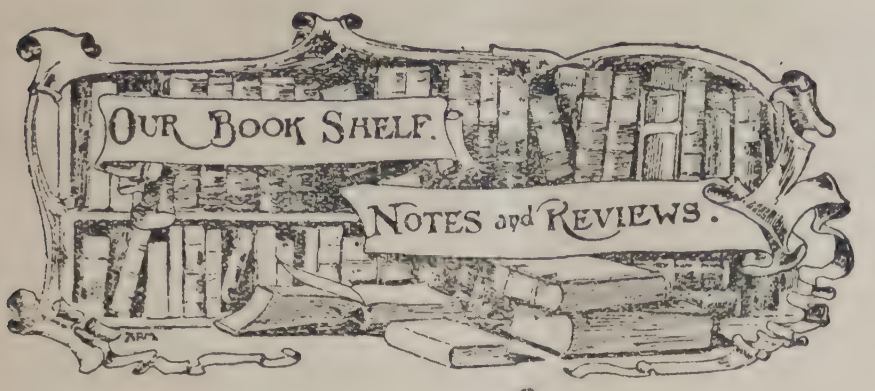
At a general meeting of the Trinidad Agricultural Society held on August 11, it was stated that sixty-two applications had been made for cotton seed, of which 762 ℔. had been distributed, and consequently it was estimated that about 100 acres were already under cultivation. It was decided to make inquiries as to the best means of obtaining a cotton gin.

Mr. J. Barclay, the Secretary of the Jamaica Agricultural Society, who has been granted a month's leave of absence, will leave the island next Tuesday for Boston whence he will proceed to Montreal. Mr. Barclay will make arrangements about the exhibits which were sent from Jamaica for the Halifax exhibition. The exhibition did not take place, and up to the present time nothing has been heard of the exhibits, but it is believed that they were sent to the Toronto Exhibition. (*Gleaner*, September 30.)

According to the *Consular Report* on the Trade of Zanzibar for the year 1902, the principal agricultural exports are cloves, copra, rubber, sugar and chillies. The value of the cloves, exported during the year, amounted to £137,172, a decrease of over £27,000, compared with the previous year. There was an increase in the shipments of copra and rubber, the values being £125,120 and £32,510 respectively. Experiments are being conducted with a view to encouraging the cultivation of several tropical products, of which both vanilla and fibre might be profitably cultivated.

A New York correspondent writes to the Jamaica *Gleaner* on the great possibilities of cacao cultivation in the West Indies. He considers it one of the most profitable crops grown. 'The point of principal production is Trinidad, though Venezuela also produces a large quantity. The Venezuelan product has a wide sale, but Trinidad is fast acquiring importance. Jamaica is not much of a factor. When Trinidad cacao sells for 14c. per ℔. Jamaica is quoted at 10c., or in that proportion.'

According to *Nature* of September 24, large quantities of gutta-percha have been obtained from New Guinea, and are at present being tested in Berlin, the Secretary of State for the Imperial Post Office having granted a large sum of money for the purpose. It is proposed by the Colonial Economic Committee of Berlin to establish a gutta-percha enterprise for the education of the native population of New Guinea in the cultivation of gutta-percha and its winning. This will take the form of a fresh expedition under Herr Schlechter for a period of three years. Assistance will be given by natives of Borneo and others familiar with the question of rubber production.


OUR BOOK SHELF.
NOTES and REVIEWS.

NATURE STUDIES. By G. F. Scott Elliot, M.A., B.Sc., F.L.S., F.R.G.S. *London: Blackie & Son, Ltd., 1903.* Price 3*s.* 6*d.*

This book is written especially for those students of plant life, who have neither the time nor the desire to take up the study of botany from the purely scientific point of view. In consequence, the author has avoided, as far as possible, the use of technical terms, merely using those that are indispensable, though he states that he has not gone so far in this direction as he would have liked.

A good deal of matter is given here that is not usually found in books of this class. For example, an account is given of the insect, fungoid and other enemies of plants and the means of defence possessed by plants against them; this is too often omitted in elementary books on nature study, with the result that a great deal of the structure of plants remains unintelligible to the student. The uses of bacteria and other fungi are also clearly and simply explained.

Numerous examples are given to illustrate special points of structure. The uses of the various adaptations of flowering plants are well discussed, explanations are given wherever possible, but no effort is made to minimize the difficulty of explaining certain plant structures.

The book is well got up and the illustrations are good. It can be thoroughly recommended to all teachers and other lovers of nature study.

FLOWERING PLANTS, THEIR STRUCTURE AND HABITAT. By Charlotte L. Laurie. *London: Allman & Son, Ltd.*

This book, together with 'A Text-book of Elementary Botany, by the same author, is written to meet the requirements of the London Matriculation, Oxford Senior Local, and other examinations.

The author has treated the subject from the point of view of plant ecology, which differentiates the book from the majority of botanical text-books; very often in these ecology is lost sight of altogether.

The book is divided into three parts: Part I.—Plant Ecology; Part II.—Histology; Part III.—Natural Orders. The first part is extremely interesting: an account is given of an ecological classification of plants, with the characters of the different classes; this is followed by an account of the distribution of plants and the factors which have influenced this; we then get a study of plant associations and some notes on how to study ecology in the field.

The histology is also treated, as far as possible, from an ecological standpoint. There is a simple, general account of plant histology, and with each organ we find a description of the modifications in structure, which are adaptations to environment.

The natural orders taken are those which are best represented in Britain, many ecological facts being introduced in this part of the book.

The illustrations, by Miss W. L. Boys-Smith, are worthy of special mention, for their clearness and accuracy.

THE BOILING LAKE OF DOMINICA. By F. Sterns-Fadelle. *Printed at the 'Dominican' Office.* Price 1*s.*

This little book gives an 'historical and descriptive account of a unique phenomenon.' The author has gathered together, from all available sources, information concerning the Boiling Lake.

It was in 1875 that the Boiling Lake was first discovered; the exploring party on this occasion consisted of Dr. H. A. A. Nicholls, Dr. Freeland, Mr. Gardyne and Mr. Edmund Watt. An account of this expedition was written by Dr. Nicholls for the London *Field.* Mr. Sterns-Fadelle gives an interesting description of the topographical and physical conditions of the Lake, as well as a general account of 'geysers,' of which the Boiling Lake is generally considered a peculiar example.

WEST INDIAN PRODUCTS.

Canadian Market Quotations.

The following notes on West Indian products in the Montreal market, dated September 25, have been received from Mr. J. Russell Murray, recently appointed correspondent of the Imperial Department of Agriculture at Montreal:—

Cacao:—Market dull and little inquiry.

Sugar:—A cargo of 2,000 tons was sold here a few days ago from Demerara. Quotations may be taken at $2·65½ for 96° centrifugals in bond. Yellow crystals we quote at $2\frac{5}{16}$ for 95°.

Molasses:—All grades of molasses in fair demand, especially Barbados.

Pimento:—There is a fair inquiry: prices have advanced in sympathy with London and New York and quotations are now from 6c. to 8c.

Ginger:—No market here for bleached. Unbleached ruling at 8c. to 10c. with good demand.

Nutmegs:—Grenada, shelled 110's, 21c. to 23c.; other sizes *pro ratâ.*

Oranges:—Jamaica supplies of these are now coming forward in good order. Prices have advanced 25c. per barrel during the week, and prices may now be considered $3·50 to $3·75, with upward tendency. Dominica fruit last year became too green and was inclined to be soft. Dominica shippers should note this.

Logwood Chips:—No heavy wood is used here, logwood chips being the form usually called for.

Cocoa-nuts:—Jamaica, fair demand at $29·00 to $30·00 per M. Cocoa-nuts shipped for Canada *viâ* Halifax save 50c. per 100 nuts in duty.

THE STRENGTH OF ROPES.

According to the *Yearbook* of the United States Department of Agriculture:—

Hemp rope, 1 inch in circumference, is calculated to sustain a weight of 200 lb.; 1½ inches, 450 lb.; 2 inches, 800 lb.; 2½ inches, 1,250 lb.; 3 inches, 1,800 lb.; 4 inches, 3,200 lb.; 5 inches, 5,000 lb.; 6 inches, 7,200 lb. Hemp is considered twice as strong as manila, and wire rope twice as strong as hemp.

MARKET REPORTS.

London,—September 29, 1903.—Messrs. Hales Caird & Co., Messrs. E. A. de Pass & Co., Messrs. Kearton, Piper & Co.; 'The West India Committee Circular,' September 28; 'The Liverpool Cotton Association Weekly Circular,' September 25; and 'The Public Ledger,' September 26, 1903.

Aloes—Curaçoa, 14/- to 30/-; Barbados, 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 1¾*d.* to 3½*d.* per ℔. Bermuda, 1/- to 1/6 per ℔.
Balata—1/11½ to 2/6 per ℔.
Bees'-wax—£7 10*s.* to £7 15*s.* per cwt.
Cacao—Trinidad, 60/- to 72/- per cwt.; Jamaica, 50/- to 64/- per cwt.; Grenada, 53/6 to 64/6 per cwt.; Dominica, 52/- to 64/- per cwt.; St. Lucia, 52/- to 64/- per cwt.; Demerara, 58/- to 62/6 per cwt.
Cardamoms—Mysore, 1/4 to 3/- per ℔.
Coffee—Jamaica, 27/- to 121/6 per cwt.
Copra—Trinidad, £15 15*s.* to £16 per ton, c.i.f.
Cotton—West Indian, 6*d.* to 6½*d.* per ℔.
Fruit—
  Bananas—Jamaica, 7/- to 8/- per bunch.
  Grape Fruit—In request.
  Oranges—Jamaica, 12/6 to 16/- per case.
  Pines-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton. Dull.
Ginger—Jamaica, 37/- to 65/- per cwt.
Honey—Jamaica, 17/- to 26/6 per cwt.
Isinglass—West Indian lump, 2/3 to 2/10; cake, 1/4 to 1/8 per ℔.
Kola Nuts—4*d.* to 7*d.* per ℔.
Lime Juice—Raw, 10*d.* to 1/2 per gallon; Concentrated, £13 to £15 per pipe. Distilled Oil, 1/5; Hand pressed, 3/- to 3/3 per ℔.
Logwood—£4 2*s.* 6*d.* to £5. Roots, £4 to £4 10*s.* per ton.
Mace—2/- to 2/8 per ℔.
Nitrate of Soda—Agricultural, £10 per ton.
Nutmegs—75's to 70's, 1/10 to 2/1; 90's to 80's, 1/6 to 1/9 per ℔.
Pimento—3½*d.* to 4*d.* per ℔.
Rum—Demerara, 8*d.* to 11*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—Jamaica, 7*d.* to 1/2.
Sugar—Crystallized, 15/3 to 16/6 per cwt., Muscovado, 11/- to 13/6; Molasses, 14/- to 15/- per cwt.
Sulphate of Ammonia—£12 7*s.* 6*d.* per ton.
Tamarinds—Antigua, 6/6 to 7/- per cwt.

Halifax, N.S.,—September 22, 1903.—'The Maritime Merchant.'

Bananas,—No quotations. Supply poor.
Ginger—Jamaica, 24c. pure bulk.
Hay—$13·00 to $14·00 per ton.
Molasses,—Porto Rico, 43c. to 44c.; Barbados, 39c. to 40c.; Antigua, 33c. to 35c.; Trinidad, 44c. to 45c.
Nutmegs—50c. to 60c.
Oranges,—No quotations.
Pine-apples—$1·50 to $2·25 per dozen.
Potatos—New, 50c. to 60c. per bushel.

St. John, N.B.,—September 22, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 41c. to 42c.; Barbados, 38c. to 39c. per gallon.

New York,—October 2, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.
Cacao—African, 12½c. to 13c.; Caracas, 13¾c. to 14½c.; Jamaica, 10½c. to 12c.; Grenada, 13c. to 13½c.; Trinidad, 13½c. to 14½c. per ℔.
Cocoa-nuts—Trinidads, $19·00 to $20·00; Jamaicas, $22·00 to $24·00 per M.
Coffee—Jamaica, fair to good ordinary, 5½c. to 6¼c. per ℔.; Manchester grades, 8c. to 10½c. per ℔.
Ginger—Jamaica, 7½c. to 8½c. per ℔.
Goat Skins—Jamaicas, 50c. to 53½c. per ℔.
Onions—No quotations.
Pimento—7¼c. per ℔., ex store.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3⅞c.; Muscovados, 89°, 3⅜c.; Molasses, 89°, 3⅛c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—October 10, 1903.—Messrs. T.S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·62 $3·75 per 100 ℔.
Cacao—$13·00 per 100 ℔.
Cocoa-nuts—$11·00 per M. (Husked nuts.)
Coffee—Jamaica, $7·50 to $8·00; ordinary Rio, $9·00 per 100 ℔.
Hay—New Brunswick, 80c. to $1·00 per 100 ℔.
Manures—Nitrate of soda, $57·00 to $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00 per ton.
Molasses—No quotations.
Onions—Madeira, $2·50 to $3·50 per 100 ℔.
Potatos, English—$4·50 to $4·67 per 160 ℔.
Rice—Ballam, $5·00 to $5·10 per bag (100 ℔.); Patna $3·50 per 100 ℔.; Rangoon, $2·60 to $2·80 per 100 ℔.
Sugar—No quotations.

British Guiana,—October 8, 1903.—Messrs. Weiting & Richter.

Arrowroot—St Vincent, $9·00 per barrel.
Balata—40c. to 42c. per ℔.
Cacao—Native, 11c. to 12c. per ℔.
Cassava—$1·08 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 10c to 11c. per ℔. (retail);
  —Creole, 10c. to 11c. per ℔.
Dhal—$3·50 to $3·75 per bag of 168 ℔.
Eddoes—$1·44 per barrel.
Molasses—Vacuum Pan yellow, 16c. per gallon, casks included.
Onions—3½c. per ℔. Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 3¾c.; American, 5c. per ℔. (retail).
Plantains—20c. to 26c. per bunch.
Potatos, English—$4·00 per barrel.
Rice—Ballam, $4·60 per 177 ℔., ex store; Patna and Seeta, $5·65 per 177 ℔.
  —Creole Rice, no quotations.
Sweet Potatos—Barbados, $1·08; Creole, $1·20 per barrel.
Tannias—$2·40 per bag.
Yams—White, $2·40 per bag.
Sugar—Dark Crystals, $2·02½ to $2·05; Yellow, $2·20 to $2·30; White, $3·50; Molasses, $1·70 to $1·90 per 100 ℔.
Timber—Greenheart 32c. to 55c per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—October 8, 1903.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Venezuelan, no quotations.
Cacao—Ordinary, $14·00 to $14·25; Estates, $14·75 to $15·00 per fanega.
Cocoa-nuts—American, $16·00 per 1,000.
Coffee—Venezuelan. 5½c. to 6c. per ℔.
Copra—$2·45 to $2·60 per 100 ℔.
Onions—$2·50 to $3·00 per 100 ℔.
Potatos, English—$2·40 to $2·75 per 100 ℔.
Rice—Yellow, $4·25 to $4 70; White Table, $5·50 to $5·80 per bag.
Sugar—Crushed, $5·50 per 100 ℔.

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(3) Seedling and other Canes, at Barbados, 1900. Price 2*d.* Post free, 2½*d.*
(5) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d.* Post free, 4½*d.*
(6) Recipes for cooking Sweet Potatos. Price 2*d.* Post free, 2½*d.*
(7) Scale Insects of the Lesser Antilles, Part I. Price 4*d.* Post free, 5*d.*
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(14) Screw Worm in Cattle at St. Lucia. Price 2*d.* Post free, 2½*d.*
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Fungi and Disease.

MANY of the most destructive diseases of both wild and cultivated plants are due to the attacks of fungi. The ways in which these fungi attack and damage plants are numerous and varied, and a study of them may be of interest to cultivators, as giving some idea of the methods by which the various diseases may be guarded against and dealt with.

A few fungi cause damage simply by absorbing food material from their host plants and so weakening these that they die of mal-nutrition. This, however, is not common. Generally the stealing of food by the fungus is the least part of the damage done, which is only indirectly due to the activity of the fungus.

Take, for instance, certain fungi which live on the surface of leaves. Some of these—the common 'black blight' is one—simply live on the surface of the leaves and take no food from them at all. They damage the host, however, by cutting off a certain amount of light, and so reducing the amount of starch or sugar that is formed in the leaves, when these are exposed to light.

Other leaf diseases are caused by fungi which live inside the tissues. Here, again, the actual amount of food taken by the fungus is insignificant, even when the whole leaf is destroyed. But the leaves are the parts of the plant which build up the organic plant food, and so when these are destroyed, the supply of this food is cut off. The cotton leaf rust may be taken as an example of this group of parasites.

Other fungi inhabit the water-carrying tubes, the wood vessels, of the plant. Their hyphae fill up the cavities of these vessels and so the current of water containing food salts in solution, which is passing up from the roots to the leaves, is interrupted. These hyphae, of course, absorb part of the food supply which is passing up the vessels, but this damage is comparatively small, compared with that done by the stoppage of the current of water. The dangerous disease of cotton, known as 'wilt,' causes damage in this way, filling up the vessels of both root and stem with its hyphae and causing the leaves to wilt. The fungus of the rind disease of the sugar-cane is another that inhabits the vessels of the stem. Other fungi similarly attack the walls of the wood vessels and destroy them, and in this way render the vessels incapable of conducting the water current.

Another group of fungi attack the actively growing regions of the different plant organs, and so stop the growth of the organs. The fungus causing the root disease of the sugar-cane may be classed here. The fungus mycelium attacks the growing points of the young roots as they emerge, thereby rendering their further development impossible. In this way the plant is unable to absorb the necessary water and food salts from the soil, and so gradually dies of starvation, although the amount of food actually taken by the fungus from its host is small.

Canker diseases are caused by fungi that attack the cambium, the tissue that forms new wood, etc. of the stem. At the point attacked the plant is unable to form new wood or new bark, and as this formation goes on elsewhere, a canker is formed. As the fungus grows it gradually spreads, killing the cambium all round the stem, and the death of the plant follows.

Again other fungi, the hyphae of which live inside the host, kill the plant tissues by the secretion of poisons into the cells. The fungi that cause the 'damping off' diseases may be mentioned as examples of this class.

Other fungi simply attack the fruits or parts for which the host plant is cultivated. In this way, although the damage done to the plant itself may be slight, the crop, so far as the cultivator is concerned, is spoiled. Fungi that cause leaf-spot diseases of tobacco, others that cause malformed fruits, and others that attack the bolls of cotton and damage the quality of the lint may all be considered under this head.

There are many other ways in which fungi may cause damage, but from what has already been said, it will easily be seen that a plant has many vulnerable points, and that a fungus which makes a successful attack on any one of these may be as dangerous to the plant as, say, a grazing animal which comes along and eats up the whole.

SUGAR INDUSTRY.

Sugar-cane Experiments in the Leeward Islands.

At a special meeting of the Agricultural and Commercial Society of Antigua held on Friday October 9, the Hon'ble T. F. Foote in the Chair, the Hon'ble Francis Watts laid before the members the results obtained by himself and the officers of the Imperial Department of Agriculture, associated with him, from the experiments with sugar-canes carried on during the season 1902-3:—

Mr. Watts said that he wished to bring before the planters at the earliest possible moment the results arrived at, so that planters might have the information to guide them in their preparations for the coming planting season; the results in detail will be published as heretofore, some considerable portion of the work being already in the press.

Dealing first with the varieties of canes, he gave a list of the order of merit, based on the weight of sugar per acre, in which the canes under observation appeared during the season under review. For plant canes in Antigua, the list with the sugar per acre (in the juice) was as follows, the relative position of the yield of sugar in the case of the ratoons being shown in an adjoining table:—

Antigua.

Plant Canes. Mean of 14 plots of each variety of cane.			Ratoon canes. Mean of 11 plots of each variety of cane.		
Cane.	Tons per acre.	Sucrose. Pounds per acre.	Cane.	Tons per acre.	Sucrose. Pounds per acre.
1. B. 208*	33·7	10,106	1. S. Seedling	24·9	6,225
2. B. 109	33·2	9,204	2. B. 208	20·1	6,116
3. B. 156*	33·5	9,177	3. B. 109	22·4	6,027
4. D. 130	32·9	9,156	4. B. 306	20·0	5,979
5. B. 306	29·9	9,088	5. D. 130	21·8	5,583
6. W. Transp.	28·8	8,278	6. D. 95	19·8	5,311
7. D. 95	27·1	8,159	7. Rappoe	19·6	5,286
8. Burke	28·6	7,909	8. Burke	19·7	5,156
9. S. Seedling*	30·5	7,905	9. D. 102	19·8	4,976
10. Mont Blanc	28·0	7,881	10. D. 74	19·1	4,833
11. D. 145†	28·1	7,736	11. W. Transp.	17·1	4,798
12. Q. Creole	27·7	7,617	12. Mont Blanc	18·7	4,792
13. Rappoe	27·1	7,451	13. Naga B.	17·2	4,788
14. Red Ribbon*	26·1	7,180	14. Cal. Queen	17·8	4,682
15. D. 102	28·3	7,046	15. B. 156	17·8	4,659
16. D. 74	26·3	6,921	16. D. 78	17·9	4,529
17. Cal. Queen	24·1	6,686	17. D. 116	17·3	4,505
18. B. 147	23·3	6,409	18. B. 147	15·9	4,457
19. D. 116	24·5	6,393	19. D. 145†	17·2	4,381
20. Naga B.	22·4	6,354	20. D. 115	17·4	4,365
21. B. 176*	21·9	6,103	21. Q. Creole	15·3	4,100
22. D. 78*	23·0	5,926	22. B. 176*	13·9	3,852
23. D. 115*	23·5	5,882	23. Red Ribbon	13·4	3,527

* Mean of 13 plots.
† Mean of 11 plots.

† Mean of 8 plots.
* Mean of 10 plots.

The corresponding table gives similar information for St. Kitt's :—

Plant canes. Mean of 8 plots of each variety.			Ratoon canes. Mean of 6 plots of each variety.		
Cane.	Tons per acre.	Sucrose. Pounds per acre.	Cane.	Tons per acre	Sucrose. Pounds per acre.
1. Cal. Queen†	41·3	9,537	1. B. 306*	22·5	6,619
2. B. 208*	35·3	9,504	2. D. 115	24·9	6,051
3. Rappoe	39·3	9,057	3. B. 147	25·4	6,013
4. Q. Creole	39·9	9,000	4. Jamaica	21·4	5,470
5. B. 306	32·8	8,795	5. W. Transp.	21·2	5,111
6. D. 115	36·8	8,612	6. B. 376	20·5	4,945
7. Mont Blanc	35·2	8,556	7. D. 74	20·0	4,904
8. B. 376	36·4	8,457	8. B. 393	19·8	4,878
9. Jamaica	34·5	8,447	9. D. 95	19·7	4,861
10. Naga B.	33·6	8,049	10. B. 254†	21·4	4,820
11. D. 116	33·4	7,989	11. Burke	17·6	4,754
12. D. 74.	31·0	7,756	12. Q. Creole	21·6	4,727
13. B. 109	34·8	7,637	13. D. 116	21·3	4,633
14. S. Singapore*	34·5	7,631	14. B. 109*	18·8	4,590
15. D. 95	26·3	7,178	15. B. 208*	17·3	4,547
16. W. Transp.	30·9	6,821	16. Naga B.	17·9	4,498
17. B. 393	27·1	6,819	17. Mont Blanc	19·0	4,452
18. B. 147*	29·5	6,807	18. Rappoe	19·5	4,307
19. B. 254	27·4	6,438	19. B. 176*	11·2	2,603
20. D. 145	29·2	6,339			
21. Rock Hall	28·5	5,748			

* Mean of 7 plots only.	* Mean of 5 plots only.
† Mean of 6 plots only.	† Mean of 4 plots only.

Attention was drawn to the satisfactory position occupied by B. 208 as a plant cane in Antigua and St. Kitt's, and as a ratoon cane in Antigua. In St. Kitt's the ratoons were not so satisfactory

B. 109 has given good results in Antigua, and appears to be worthy of cautious planting.

D. 95 occupies a lower position this season on account of dry weather.

The characters of some of the canes were then discussed in detail, attention being drawn to the high saccharine content of the juice during the past dry reaping season, the richest juice on the average being that from B. 208 ratoons, in Antigua, which contained 2·36 ℔. of sucrose per gallon.

The case of the Burke cane was mentioned. It had been under discussion in previous reports as an instance of a seedling cane which appeared to be improving in character. In the season's experiments it has given a good tonnage of canes with rich juice.

Attention was drawn to the relative positions occupied by the various canes in the plant cane and ratoon lists, and satisfaction was expressed at finding that most of the best plant canes have good ratoons.

The absence of rotten cane is a prominent feature of the varieties, and one which makes them most useful as aids to combating cane diseases and their effects.

Mr. Watts referred to the fact that during the past season, Mr. Sands had succeeded in raising, at the Botanic Station, upwards of 500 seedling canes, most of which were now growing in a field at Skerrett's. This is the first occasion upon which any considerable number of seedling canes has been raised in Antigua.

Passing to the work done in connexion with the manuring of sugar-canes, Mr. Watts congratulated himself and the Society that he was able, as the outcome of work in a very difficult field of investigation, to lay before the members results which appeared to be of a definite and useful character. The Leeward Islands experiments consist in the manifold repetition of a series of thirty-three experiments, each of these has now been repeated twenty-eight times in the case of plant canes, and twelve times in the case of ratoons. A list of the experiments was displayed in the hall, together with a diagram summarizing all the results. This diagram enabled the members to follow the results of the experiments at a glance, and showed both the yield of sugar from each experiment and the monetary gain or loss.

In the series of experiments with *plant* canes, various artificial manures were added to plots which had been prepared and planted in the usual manner, and which had for the most part received applications of pen manure; the object being to ascertain whether it will prove remunerative to use artificial manures in addition to the present methods of working. Although there was an increase in the amount of sugar in every case, yet in almost every case the amount of sugar failed to compensate for the cost of the manure, hence it was stated that when plant canes were properly planted, with an adequate supply of pen manure, according to the custom of the Leeward Islands, artificial manures are not necessary, and will not prove remunerative.

With *ratoon* canes the diagram showed that the case was very different. In most instances there was a large increase in the amount of sugar, and considerable monetary gain. Many points of interest and importance were elucidated, for which there is no room for discussion here, but amongst the chief points brought prominently forward were the great need for nitrogenous manures shown by ratoons; that better returns are obtained when the nitrogenous manures are given in one early application rather than in two doses. Potash and phosphate, while increasing the return, do so only in a minor degree, and are but slightly remunerative. Large crops of ratoons can be grown by the use of nitrogenous manures without potash and phosphate. On the whole, nitrate of soda had given slightly better returns than sulphate of ammonia. If guano is used for ratoon canes, it should be given early, in one application, and not divided into two doses, one early and one late.

These, and many other points which were clearly brought out in the diagram, Mr. Watts believed might be taken as reliable and useful information for the guidance of planters. Some of the results were somewhat unexpected, as for example the comparatively small influence of phosphates, particularly as the soils of the Leeward Islands are deficient in phosphates, and also the considerable falling off in yield as the result of giving nitrate of soda or sulphate of ammonia in two doses instead of one. Facts like these can only be arrived at by the laborious method of field experiments, involving much work, and repetition year after year.

Essential Oil in Fodder Crops. When hay is cut, the odour produced is due to a volatile oil. This material is lost when the hay is overcured or exposed to leaching rains. The odours of all fodder crops are imparted by characteristic essential oils. In the preparation of hay and fodder crops, it should be the aim to prevent, as far as possible, any loss of essential oils. This can be accomplished by cutting the fodder before it is overripe, and then avoiding bleaching and leaching. (Synder in *The Chemistry of Plant and Animal Life.)*

WEST INDIAN FRUIT.

FRUIT TRADE FOR BRITISH GUIANA.

The Demerara *Daily Chronicle*, of October 7, publishes an interview with Mr. John Junor, the manager of Vryheid's Lust plantation. In this interview Mr. Junor gives his views on the possibilities and prospects of an export trade in fruit for Demerara. The following extracts are of interest:—

> Nothing whatever stands in the way save steamer facilities. We can grow fruit here equal to any in the world. I propose to export oranges and pine-apples, for these fruits can be grown in any quantity on the Demerara river. The lands up the Demerara river are among the best lands in the world, the only thing wanted being good drainage.
>
> There has never been any fruit export trade in this colony, but the fruit is here, ready to export, all the same. I can put half a million oranges in the market any season. Indeed, I have sold more than that number already in a good season. I sell at a very low rate. To give you an example: Oranges were very scarce last season, and I received as much as 60 cents per hundred; but when they are plentiful, I get no more than 24 cents per hundred. A good tree produces 1,500 or more oranges in one season, and the average life of a tree is about thirty years. The Tangerine oranges are the favourites in the market, and for these I get 36 cents per hundred, the sweet oranges realizing 24 cents. In a good season I sell for four months in the year, and there is always a ready sale for oranges locally. I have sent frequently to London and Canada, and the oranges have arrived in splendid condition. I pick them fresh and cut them with a patent knife, always leaving the stem on, because if the fruit is pulled off the stem the orange is spoiled, a portion of the skin being torn off. Besides, the pressure of the hand might injure them. I have a net for catching them when they are cut, and they are never handled until they are being packed into boxes.
>
> So far as shipment to England or Canada is concerned, there would be no difficulty whatever with oranges or pine-apples; they would easily stand the voyage. But unless it were shortened to eight or nine days I do not think bananas would stand the voyage. The banana here ripens in seven days and might last to nine or ten if stored in a cold chamber. With oranges, however, there is not the slightest difficulty. I intend to send some away next Christmas. I really think there is an excellent opportunity now for a large fruit cultivation and export trade here.

THE FRUIT AND VEGETABLE MARKETS IN ENGLAND.

The following notes on the position of the Fruit and Vegetable markets in England for the week ending October 3, which appeared in the *Daily Telegraph*, have been forwarded by Mr. John R. Jackson. Mr. Jackson points out that the great scarcity, this season, of British grown fruit has not only led the consumer to conjecture how the shortage is to be made up, but it has also promptly put the colonial and foreign producer on the alert to supply the deficiency:—

> The shortage of the home supply of apples is making itself rather strongly felt at present, but America has come forward to relieve the pressure with large consignments which should conduce to lower prices in the coming week. English grown plums, which have made such a poor show this year, are almost a thing of the past. For eating, of course, nothing can be finer than the better kinds of golden drop plums from California, and of these the retail shops are showing quantities. West Indian and South Australian oranges have in a measure relieved the scarcity of fruit within the past fortnight. The Jamaicans are rather pale in colour but prove delicious eating and have the virtue of being cheaper than the Australians by one penny a piece. Oranges do not become a popular fruit however, until nearer Christmas, when we may also expect the delightfully refreshing grape fruit. Mangos are scarcely worth consideration, although they are easily to be procured, just at present, in excellent condition. There is not much activity to record in the vegetable market. Sprouts are good and realize a higher price. Cauliflowers in consequence of the mild weather are abundant and cheap. French beans and scarlet runners are dearer than they were, but of good quality; while of cabbages there is still an even and excellent stock. The present condition and price of potatos should induce housekeepers to purchase in large quantities for storing purposes. The avocado pear has made its way in the English market but it is generally classed among fruit, whereas it is either cooked or served as a vegetable with white sauce, or eaten as a salad with pepper and salt. In England they are retailed at anything from 1*s*. to 1*s*. 3*d*. each, but of course the supply is very limited and spasmodic, because as a vegetable it is practically unknown here.

Mr. Jackson suggests, that with such short fruit and potato crops, the West Indies can assist the mother country by increasing the exports of such produce as avocado pears, chochos, sweet potatos, etc.

COTTON.

Cotton Seed Oil.

The *Tropical Agriculturist*, of September 1, publishes an article taken from *Capital*, in which the establishment of a cotton seed oil industry in India is advocated. In view of the progress of cotton growing in the West Indies, some of the arguments adduced will be of interest:—

Experiments were conducted by makers of cotton seed oil machinery in America, on a working scale, to demonstrate that Indian seed contained sufficient oil to make the extraction profitable. Hitherto it had been held that the establishment of a cotton seed oil industry was impossible, chiefly on the ground of its being too poor in oil. Favourable reports were received together with samples of the products. It was reported: 'The samples of cotton seed have been received. Our opinion is that the seed is very rich in oil, equal to, if not better than, American seed. We think from the results that we have obtained here, that we could handle Indian cotton seed and get the very best results from it.' About ten years ago when Dr. J. A. Voelcker was reporting on the possibilities of improvement in Indian agriculture, Dr. Watt pointed out to him that, reckoning from the cotton produced and after deducting what seed is used for home consumption and for re-sowing, there ought to be 600,000 tons of cotton seed available for export. At the time of Dr. Voelcker's visit, little cotton seed was being sent out of the country, but as last year's exports had mounted to nearly 200,000 tons, his observations in regard to the export of oil seeds in general may appropriately be quoted in the present connexion: 'Now it is clear that, as these seeds are for the greater part exported, their export must imply the removal of a very considerable amount of the constituents of the soil. Were they (with the exception of castor-oil seed) to be consumed by cattle after expression of the oil, the manurial constituents would be returned to the soil from which they were drawn, and the balance of fertility might be maintained. The oil itself, having no manurial properties and being derived from the atmosphere and not from the soil, is a fitting object for export; but to send away the entire seed or the refuse after the removal of the oil, is to send away the valuable manurial constituents contained in the seed, including those taken out of the soil itself; in brief, to export them is to export the soil's fertility.'

The Revival of the Cotton Industry.

In view of the efforts that are now being made to revive the cotton industry in the West Indies, the following account of the position of the industry in Grenada and Carriacou one hundred years ago, taken from the Grenada *Chronicle* of September 26, is of considerable interest:—

The interest, that is now being taken in the cultivation of cotton in the British possessions, will recall to the minds of many, who are living, the impetus that was given to the cotton industry in the West Indies forty years ago by the great cotton famine in England, brought about, it will be remembered, by the Civil War in America. British manufacturers, in their dilemma, turned their attention to other sources from whence the material could be procured, and as the West Indies in the early years of the century could supply England annually with 80,000 bales of about 200 ℔. weight each, attention was naturally attracted to them.

In Grenada, which had once been a cotton-producing colony of some consequence, every available spot of suitable land was planted in cotton and gins were constructed in all directions. At Carriacou, where almost every acre is adapted to the cultivation of the plant, a great impetus was also given to the industry and many of its inhabitants became comfortable and happy through it. But this success with cotton did not continue long for us. The Civil War terminated early in 1865, the blockade was raised, the devastated fields of the Southern States were again cultivated, and soon immense exports of raw cotton to England ousted those of the West Indies from the field.

It will be interesting at the present time to give some particulars of the cotton trade of this colony one hundred years ago. At that time, on the considerable area of land at the southern extremity of this island, now used exclusively for pasturing live stock, flourishing plantations existed, which were capable of producing large quantities of cotton. For instance, Grand Ance in 1803 produced 40,896 ℔.; Point Saline, 39,884 ℔.; Morne Rouge, 18,190 ℔.; Portici, 21,340 ℔.; True Blue, 27,340 ℔.; and Mt. Hardman, 14,676 ℔. The saline ingredients in the soil and atmosphere of these lands render them peculiarly adapted for the growth of cotton.

As for Carriacou, the aggregate crop of the island in the same year was 527,379 ℔., or 4,708 cwt., just double what the annual crop is at present. At that time the price per ℔. in the English market was higher than 2*s*. The valuable properties contained in the seed of the plant had not yet been discovered, so cotton seed was then valueless.

If the dependency under its present improved conditions could be made to produce a similar quantity annually,—and why not more? for in 1803 Carriacou was also contributing a by no means insignificant quota to the sugar crop of the colony, and all the sugar estates being now abandoned, the lands are now available for cotton—what a source of wealth it would be to it; 527,379 ℔., at say 6*d*. per ℔. would amount to £13,189, and this without accounting for the seed!

BARBADOS CATTLE FOR THE NIGER.

The following paragraph, relating to the purchase of Barbadian cattle for Southern Nigeria, which originally appeared in *The Times* of September 25, is taken from the Barbados *Advocate* of October 29:—

Reuter's Liverpool agent telegraphed yesterday that arrangements have just been concluded between the Southern Nigerian authorities and Messrs. Elder, Dempster and Company for the conveyance, by the steamers of the latter's line, of a number of Barbadian cattle into West Africa. The cattle, including in the first instance eighteen milch cows and two bulls, are intended for the Government Cattle Farm, N' Kissi, to improve the milk-producing kine on that river. Mr. P. V. Young, Commissioner of Agriculture for Southern Nigeria, is visiting Barbados to select the animals, and very great interest is being taken in the experiment, which is regarded from a health point of view as most important to white men in Nigeria. The cattle will be shipped next month or November and will be landed at Grand Canary from Barbados and taken thence by the Elder, Dempster Line to Burntu, Southern Nigeria.

SCIENCE NOTES.

The Tannia or Eddoe.

This plant, whose botanical name is *Colocasia esculenta*, is known by a variety of names. The name, tannia, is probably most generally used, though the spelling of it varies considerably—'tanier,' 'tannier,' 'tania,' all being found. In Jamaicia yet another name—coco—is given to the plant; while in the East it is called 'taro.'

Colocasia esculenta, belonging to the natural order *Araceae,* is a stemless perennial herb with large arrow-headed leaves. It is cultivated for the sake of its starchy root-stock, which is frequently large and thick. As a food crop this plant occupies an important place in the West Indian Islands, its tubers being one of the principal articles of diet among the poorer classes. In addition to the rhizomes, the young leaves are eaten as a vegetable.

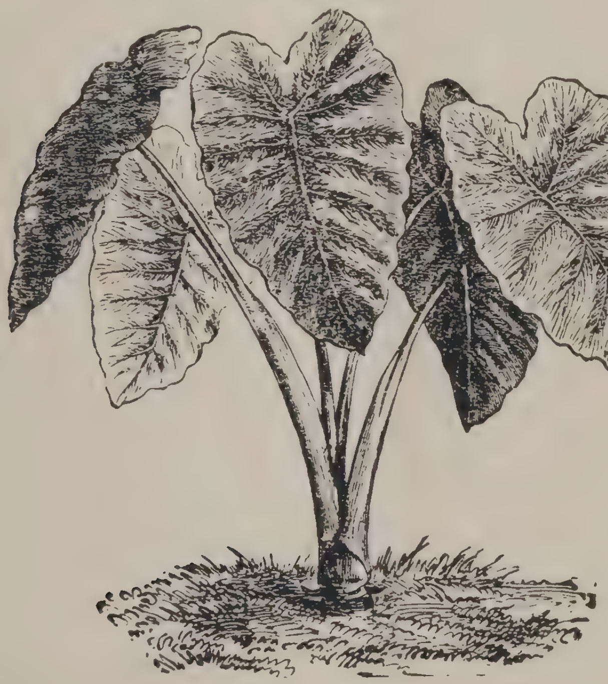

Fig. 33. Colocasia esculenta.

[From *Dictionary of Gardening.*]

The cultivation of tannias is of a very simple nature, being similar in most respects to that of yams. In good land, that has been well prepared, large crops can be obtained. At the Agricultural School in St. Vincent, 4,336½ lb., valued at £13 12*s.* 11*d.*, were dug from ½ acre.

In these islands this plant has another important use, namely, as a shade plant. It is particularly well adapted for shading young cacao plants, and has been similarly used for coffee.

Goats' Milk.

The following note on the composition of goats' milk, which originally appeared in the *World's Work,* is taken from the *Agricultural World* of October 10:—

Goats milk is much richer than cows' milk. The vulgar notion that it has a peculiar taste is all nonsense. In countries, where cleanliness in utensils and the washing of the hands before milking are not thought much of, the milk may possibly acquire an objectionable flavour; but after repeated experiments on friends with milk from various goats, the writer has never heard people, who tasted it for the first time, say any more than that it was excellent and that it resembled ordinary cows' milk. This is the verdict of every goat-keeper.

The richness is not, of course, a matter of opinion. Chemical analysis shows that on every point goats' milk is the superior of cows' milk. In butter-fat its value is more than double cows' milk. In the nutritious cheese-forming substance its better quality is also marked. As is well known, the owners of cows have often the greatest difficulty in keeping the milk they sell up to the standard of fat, which the adulteration law requires, and are occasionally fined, although they have not added water. Goats' milk, on the other hand, is almost invariably twice as good as the inspectors demand that cows' milk shall be.

The average composition of goat's milk has been given in the *Agricultural News* (Vol. II, p. 168).

THE MANUFACTURE OF TAPIOCA.

The following interesting account of the manufacture of tapioca is taken from the *Queensland Agricultural Journal* for August:—

The manufacture of cassava starch is much the same as that of arrowroot. The roots are well washed, after being peeled, to get rid of as much of the poisonous principle as possible. If the roots are left for a couple of days in water, the skin comes away more easily. They are then passed through a grating machine. The starch and fibre pass from this into a cylinder or trough covered either with strong muslin or fine brass wire netting. Continuous streams of water are now poured upon the grated mass to separate the starch from the fibre. The starch, held in solution by the water, passes away into a lower receptacle consisting of a row of barrels or vats. The fibre, thoroughly cleaned of starch, is then removed from the cylinder, and either turned into manure or fed to stock, having, however, little feeding value.

After the starch has settled in the vats, the water is gradually drained off through a series of taps, one above the other. More water is now poured in, the starch is well stirred, and then again allowed to settle. This process is carried on until the starch is perfectly white. It then remains in the vats until the surface is dry, when it is cut out in lumps and made ready for further operations. If tapioca is required, the lumps of starch must be thoroughly dried on airy shelves before they are placed on horizontal tin plates, beneath which is a hot-air pipe, in which a particularly gentle heat is maintained. In Europe, tapioca is usually sold in the form of flakes which are made by placing the lumps of starch in a nearly dry state in deep pans where they are subjected to strong heat and are continually stirred until they have acquired the desired form.

In the Straits Settlements 'pearl tapioca' is made in the following manner:—

The dried masses of starch are placed in a hand mill, where they are reduced to the size of No. 4 shot. From the roof of the factory hangs a coarse cloth, like a verandah hanging mat or blind, kept spread out by a crosspiece of wood so that it looks like a canvass boat. This cloth is filled with the shot-like starch and it is then swung backwards and forwards by two men. Under this treatment the grains are ground into perfectly round little balls which require to be once more warmed for half an hour by gentle heat in a pan when the process is complete. In fine weather they are often exposed for half a day to the sun's heat.

HORSE BREEDING IN JAMAICA.

At the request of his Excellency the Governor of Jamaica, a Committee of the Board of Agriculture was appointed to inquire into the matter of improving the horses of the island. The latest issue of the *Bulletin of the Department of Agriculture* contains the report of the Committee. It is stated that a circular letter was drawn up and sent to the chief breeders and authorities on horseflesh in the island. Thirty-five detailed replies were received. We extract the circular and mention some of the principal recommendations :—

CIRCULAR.

In accordance with the special desire of his Excellency the Governor, the Board of Agriculture proposes to formulate practical suggestions for the improvement of horse breeding in Jamaica. We have been appointed to investigate and report thereon to the Board and have the honour to request your valued assistance and advice.

We submit the following points of reference for your observations :—

1. Should stallions be imported? If so, of what type or types?
2. Is it desirable to import mares? If so, what are your practical recommendations?
3. What are your opinions as to the present standard of horseflesh producible in Jamaica?
4. In what direction is it desirable to encourage the aims of horse-breeders?
5. What conclusions can be drawn from the results of the sires imported by the Agricultural Society?
6. What practical suggestions do you offer for the consideration of the Government—(1) for promoting better returns from our present stock of horseflesh; (2) for infusing fresh blood by judicious importations?
7. What prospects are there for an export trade in horseflesh—(1) to other West Indian Islands; (2) polo ponies; (3) Mounted Infantry Remounts.
8. What are your views as to the secondary advantages of producing larger stock for breeding draft mules?

SUMMARY OF RECOMMENDATIONS.

Question 1: There is a strong general opinion that stallions should be imported. There is a great variation of opinion as to the type most desirable. We recommend the importation of a stout, up-standing thoroughbred, of at least 16 hands, for getting draft stock and remounts and increasing the size of mares for mule breeding.

Question 2: (1) When the stock farm is established, some mares should be imported for breeding. These should be well bred, cheap and of various types. (2) Inquiry should be made as to the cost of landing *(a)* cast Army mares of light cavalry type, *(b)* cast Hunter mares. If obtainable at a low price, a trial importation should be made and the mares sold by auction.

Question 3: It has been brought out that (1) horses have deteriorated greatly during the past twelve years; (2) this has been associated with a decline of racing, whereby sires have ceased to be regularly imported; (3) the present horses are greatly inbred and most of the mares are served by poor stallions; (4) good horses can be produced, but fresh blood and care in selection and feeding are necessary; (5) a demand exists for a better class of horse.

Question 4: (1) Before any action can be taken by the Government, we must ascertain from the War Office their requirements in light horses for tropical and sub-tropical conditions; (2) castration should be made compulsory or a tax placed on entires not approved by a Government inspector; (3) a Government or subsidized sire should be made available to the peasantry in all districts.

Question 5: There is a general concensus of opinion that the Hackneys were not only a failure in fact but also in principle. The Hackney is a composite animal and when crossed with a pure breed is apt to throw back to undesirable ancestors. The Welsh pony has carried many away from the comeliness of his get, but clearly this has been 'breeding from capital' and has resulted in the deterioration of the size of our horses.

Question 6: The following practical suggestions recommended themselves to the committee:—(1) Institute a Stock Farm and import breeding stock; distribute progeny at an annual sale; take in mares for horse breeding department to be attached to Stock Farm scheme; (2) *(a)* subsidize local stallions, *(b)* import and localize stallions; (3) pass a castration law; (4) inquire of and use influence with War Office with regard to a remount trade.

Question 7: (1) There is a demand for racers and draft stock from the other islands and considerable extension of this trade can be relied upon; (2) polo ponies must be left as a speculation for players who can make a smart polo pony out of a £12 animal; (3) the light cavalry remount is the foundation upon which a revival of our horse-breeding industry must be based.

Question 8: (1) As regards horsekind, the mule problem will be solved by a general improvement in the former on lines already laid down; (2) premiums should be paid for approved jacks to be used by the peasantry at a nominal fee; (3) we do not approve of compulsory castration of donkeys, since this would deteriorate the working powers of the beasts of burden of the small settlers: (4) one or more high class jacks of the Maltese type should be imported; improved donkeys should be bred at the Stock Farm from selected Jamaican asses: (5) the Horse Show should be encouraged, and a special grant for horse prizes made at the chief Shows in the island.

HOW TO ERECT A TEMPORARY RESERVOIR.

The following is suggested by Mr. A. J. Jordan, Agricultural Instructor, Montserrat, as a simple way of overcoming the difficulty of obtaining a supply of water when spraying crops on the hillside :—

Take two logs of wood and upon these fasten with screws sheets of galvanized iron. On the lower side of the iron sheets let an old puncheon or cask into the ground. A piece of iron sheeting or half a bamboo stem might be used as a gutter to conduct the water into the receptacle.

With two sheets of galvanized iron 10′ × 2′ about 24 gallons of water should be collected for every inch of rain that falls.

An Abnormal Lime. Mr. J. H. Hart, of Trinidad, recently forwarded to this Department what appeared, at first sight, to be a 'twin' lime. On making a cross section, however, it was apparent that the parts were not entirely duplicated. The placenta, instead of having the normal form of a straight line across the fruit, had branched in one plane so as to be almost circular in form, with segments of the fruit both without and within the circle. Those within were however small and more or less rudimentary.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 351 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d., post free 3s. 3d.

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NOTES AND COMMENTS.

Exports of British Honduras.

The *Report on the Botanic Station, British Honduras*, has, as an appendix, a table showing the exports of the principal agricultural products during the last six years.

The exports of cocoa-nuts have steadily increased from 1,553,659 in 1896 to 3,273,171 in 1902. The number of bunches of bananas remains about the same, though the export of plantains has increased about 50 per cent. The exports of rubber and cacao show a decided increase; honey and bee's-wax now make their appearance on the export list.

Trade and Agriculture of Hayti.

The *Consular Report* on the trade of the Republic of Hayti has just been issued. The principal agricultural exports are coffee, cacao, cotton, logwood and gaïac. The last harvest of coffee yielded 9,268 tons, not much more than half that for the corresponding period of the year before. Nearly the whole export went to Havre. The harvest of cacao was small. The export of cotton amounted to 770 tons and 11 sacks of cotton seed. Logwood sold easily in Europe and the United States, 49,636 tons being exported. The export of gaïac, Lignum vitae, (*Guaicum officinale*) has increased considerably, 3,048 tons of wood and 27 tons of gum being exported. With regard to the cotton trade, it is stated that '3 lb. of seed-cotton yield 1 lb. of cotton, the waste being also exported. As soon as coffee rises in price, the gathering of cotton will again be abandoned.'

The Industrial Resources of Trinidad.

A pamphlet with the above title by Professor Carmody, F.I.C., F.C.S., has recently been published in Trinidad.

In this pamphlet an interesting comparison is made between the present position of the main industries of the island and their position eight years ago, when the author read a paper on the same subject at a meeting of the Institute. The change that has taken place in the relative positions of sugar and cacao since 1895 is most striking. In that year the values of the exports in these two products amounted to £650,000 and £500,000, respectively; for the year 1902-3 the values were £427,000 and £907,000. It will thus be seen that, while the value of the sugar exported has declined considerably, that of cacao has been more than doubled. It is stated that the cacao planters are endeavouring not only to maintain but also to improve the position now occupied by cacao, chiefly by the use of artificial drying.

There has been a serious decline in the value of cocoa-nuts exported, which is due not to any falling off in the numbers exported but to a lowering of prices. A considerable trade is now done in copra and cocoa-nut oil.

The following general remarks are made by Professor Carmody on the agricultural position of the colony: 'Notwithstanding the falling off in sugar, the period has been one of marked agricultural progress among the labouring class. Cane-farming has given them an opportunity of working on better terms with the estate owners. In addition to the stimulus given by cane-farming, other influences have assisted. The attention given to agricultural education, the extension of roads and railways, the establishment of the Imperial Department of Agriculture have all contributed to render agriculture more attractive and remunerative.'

West Indian Trade with Canada.

The recently issued *Statistical Yearbook of Canada for 1902* gives a statement of goods imported from the British West Indies during the year ended June 30, 1902.

The value of the imports amounted to $1,702,293, of which $51,485 represents the value of goods imported through foreign countries, and $1,650,808 that of goods imported directly. The most prominent articles in this list are sugar, valued at $880,728; molasses, valued at $436,468; hides, valued at $72,624; fruits, $72,064; cacao, $43,568; cocoa-nuts, $38,034.

On the other hand, Canada exported to the British West Indies goods to the total value of $1,974,379. The principal items on this list are fish, valued at $969,328; oats, $164,287; flour and other bread-stuffs, $148,497; dairy products, $90,358; and potatos, $70,643.

An interesting account is given in this book of the progress of the beet sugar industry. Several companies commenced operations in 1902. The first year's efforts by four companies resulted in the production of 6,915 tons. About 160 farmers supplied the beets for these companies. The average sugar content was 15·06 per cent., and the average receipts per acre were $51·36.

Tanning Plants.

The August number of the *Queensland Agricultural Journal* contains a paper by Mr. George Turner on 'Tanning material as a profitable crop.'

Mr. Turner advocates the growth tanning of plants with a view to supplying the local demand for tannin, which is at present met by yearly importations to the value of over £18,000. It is in stated that the Museum of Economic Botany Brisbane contains specimens of seven indigenous species of *Acacia*, the barks of which yield 7·5 to 15 per cent. of tannin. These plants are known locally as 'wattles'. In addition to the wattles, there are many other tanning plants suitable for cultivation in Queensland, among them being *Rumex hymenosephalus*.

The tendency nowadays in the tanneries is to use liquid extract as a tanning agent. For this purpose, twigs, leaves, bark and roots of trees yielding tannin may be utilized, and this seems to offer an easy and payable method of making use of the mangrove, much of which yields a high percentage of tannin. Unfortunately, the blood-red colour given to leather, when this plant is used, is an objection to its use.

There are a number of plants in the West Indies that yield tannin, among them being divi-divi *(Caesalpinia coriaria)*, cashew *(Anacardium occidentale)*, red mangrove *(Rhizophora Mangle)*, white mangrove *(Laguncularia racemosa)*, guava *(Psidium Guava)*, etc.

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Practical Seed-testing

The *Farmer and Stockbreeder*, of October 5, contains a useful and instructive article entitled 'Seed-testing at Home.'

The fact that a good crop depends particularly upon good seeds necessitates the knowledge of what 'good seeds' are, and how to produce them. Good seed is first, living seed, and secondly, seed free from weeds and other impurities. To find out what percentage of seeds in a sample is living or capable of germination, and what proportion of impurities it contains, is the reason for testing seeds.

In order to ascertain the percentage of purity of any sample, the purchaser is advised to take a shee of white paper and draw lines upon it so as to make ten squares, each of about 2 square inches, in two rows of five each. The seeds of the sample should then be spread out so as completely to cover the ten squares. The seeds should then be taken from any five squares and separated. The genuine seeds of the sample should be placed in one heap, all other seeds in a second, and in a third all mechanical impurities, such as sand, pieces of the fruits, etc. Each heap is then to be counted and from the total of these three, the percentage of genuine seed can be calculated. In order to determine the real value of the sample, it is necessary to obtain the percentage of germination. Detailed instructions as to the carrying out of this will be found in the *Agricultural News*, Vol. II, p. 153.

Cocoa-nut Cultivation in the East.

The *Colonial Report on Seychelles for 1902* contains a report by the Curator of the Botanic Station on his mission last year to Ceylon, the Straits Settlements, the Federated Malay States, Java and Sumatra in connexion with the cocoa-nut industry. Mr. Dupont's report is full of interest and much of the information contained in it should be useful to West Indian planters.

In the selection of nuts for planting, those of a medium size with a thin husk and from a heavy-bearing tree are preferred. The nuts usually remain four months in the nursery, for which should be selected a piece of good land, where water is available. During dry weather watering is necessary every two days. The nuts should be placed on the side and half buried in a deep loose soil. In planting, holes should be dug, 3 feet deep and 2½ feet wide, and filled with good soil. Up to the third year plantations should be kept clean and weeds buried, after that it is only necessary to pull up bad weeds by hand. The big roots of the cocoa-nut must be given a free circulation and all soils that are not sandy enough must be loosened. This operation is conducted by buffalo ploughs at the time of weeding. In stiff soils the hoe is used. Green manuring has recently been started on some estates. Sensitive plants, containing about 1 per cent. of nitrogen, and other small leguminous plants are dug into the soil. Besides green-manuring there is a regular system of pen-manuring. In addition to the estate stock, the village cattle are allowed to graze freely on the estate. At night or when they are not working, they are tied in couples to a tree. Artificial manures are freely used as well as wood ashes, crushed bones, castor oil cake, etc.

With regard to yield, figures are given for one estate, consisting of 486 acres, on which 21,300 trees are at present bearing. In 1902, the total number of nuts was 1,300,000, or at the rate of sixty-two nuts per tree. It is pointed out that in the last two years, since a proper system of cultivation and manuring was started, the yield has increased nearly 50 per cent. On a neighbouring small estate on an alluvial soil which is inundated every four to five years, and cultivated in the same manner, the average yield per tree is 113 nuts per annum. In Seychelles the nuts are never plucked but simply allowed to fall on the ground. In Ceylon they are plucked at regular intervals, the coolies climbing up the trees or employing a long bamboo to which a hook or a very sharp knife is attached.

A detailed account is given in the report of the various industries connected with cocoa-nut culture. These consist of copra drying, the manufacture of fibre, of oil, and of desiccated cocoa-nut. Copra is dried by the smoking process. A layer is placed on a platform of laths, 5 or 6 feet from the ground, under which the shells are burnt. The manufacture of fibre consists in first crushing the husks, then fermenting them in vats and afterwards breaking and cleaning them. By the hydraulic press 62 per cent. of oil is extracted from the copra. The yield of desiccated material is from 350 to 400 ℔. from 1,000 nuts.

INSECT NOTES.

The Cotton Worm.

In a previous number of the *Agricultural News* (Vol. II, p. 330), the use of Paris green as a dry mixture with finely-sifted, dry, air-slaked lime has been recommended. The dry mixture has been the more strongly advocated because it requires no expensive apparatus for its application and because there are so few spraying outfits in these islands. While the cotton worm occurred only sparingly, as was the case at the beginning of the season, 1 ℔. of Paris green in 50 to 100 ℔. of dry lime seemed to be sufficient; but now that every field attacked soon comes to have enormous numbers of caterpillars, this mixture is found to be too dilute.

Recent trials of a mixture at the rate of 1 to 10 seem to give good results; while the Hon'ble F. Watts and Mr. W. N. Sands write that in Antigua the mixture is most successfully used at the rate of 1 to 6.

The amount necessary per acre varies, of course, according to the size of the plants, but in Antigua 1 ℔. of Paris green has been found to serve for one application for $\frac{1}{2}$ to 1 acre. An experiment, conducted at the Botanic Station, Barbados, has indicated that, mixed in the proportion of 1 to 10, a pound of Paris green will be sufficient to dust $\frac{1}{3}$ to $\frac{1}{2}$ acre.

Used as a spray, Paris green has been recommended in a mixture at the rate of 1 ℔. to 150 gallons of water with two or three times its own weight of lime. This mixture may be made stronger—1 ℔. to 100 gallons of water—if a proportionate increase in the amount of lime be made. In preparing a Paris green mixture for spraying, the poison should first be mixed with a small quantity of water and then added to the full amount, otherwise there is a possibility of its not getting thoroughly mixed.

Combating the Cotton Worm by means of Parasites.

Among insects, as among all other groups of animals and plants, there is constantly going on a keen struggle for existence. Insects are preyed upon by animals in other orders such as birds, toads and lizards, and by other insects, examples of which are very easy to find. The wild bees eat caterpillars; the dragon-flies or pond-flies capture and devour butterflies, grasshoppers and even other dragon-flies; lady-birds (coccinellids) eat plant lice and scale insects. Many more examples might be given. In addition to these predaceous insects, there are others still more common and much more effective in checking extreme outbreaks of insect pests. These are parasites, and they are extremely abundant.

Parasites are of two kinds—external and internal. Examples of the former are the very familiar reddish mites found attached to the body and wings of grasshoppers. These act in a similar way to those parasites of the higher animals, the lice and ticks of man, cattle, dogs, fowls, etc. In the insect realm internal parasites are of much more importance than external. These have a wide range in habit, structure and relationship, but the commonest are certain two-winged flies *(Diptera)*, and certain of the wasp-like, four-winged flies (*Hymenoptera*). Insects of nearly all orders are attacked by internal parasites, and the attack usually results in the destruction of the individual attacked, or the host, as it is called.

Two of these internal parasites have recently been reared from pupae of the cotton worm by the Entomologist on the staff of the Imperial Department of Agriculture. A large number of pupae was kept in boxes and jars under favourable conditions for the moth to emerge. After eight days no more moths emerged, but on the ninth and subsequent days a number of small flies appeared and a few small black and white *Hymenoptera*. Although at present nothing is known of the early stages of these insects, yet it is possible, from our knowledge of other similar insects, to give a general account of the life-history of each.

This parasitic fly is at first glance not unlike the common house-fly, but comparison shows it to have more bright colours on the head, and the body is covered with rather long, stiff hairs. It belongs to the family *Tachinidae* or Tachinid flies, nearly all of which are parasitic.

The adult female has no sting or ovipositor, so that when the eggs are laid they are merely fastened upon the skin of the caterpillar which is attacked. If the caterpillar sheds its skin at once, the egg may be cast off with it, but it generally happens that the egg hatches before the moulting of the skin takes place. In this case the small, white, footless maggot, which comes out of the egg, immediately bores its way through the skin of the caterpillar, which is now the host, furnishing both food and protection to the unwelcome guest. Here this small maggot lives and grows, feeding on the vital fluids of the host. In spite of this tax upon it the caterpillar is able to go on to the pupa stage; but when this is reached and no more food is being taken in to supply the demands of the maggot, the guest eats up the host itself. All the concentrated energy and dormant life, which should go to develop a moth capable of reproducing its kind, is converted into a fly, whose object in life is to live at the expense of some other insect, and so instead of a moth there emerges from the cocoon a fly. The hymenopterous parasite differs from the fly in the method of depositing its eggs. This one has a sting-like ovispositor, by means of which it is able to insert its eggs under the skin of the caterpillar, and then there is no escape for the unlucky host.

At present the cotton worm parasites are very few in proportion to the extreme abundance of the host, but later the proportion of parasites to host will be much higher.

Insects in their native localities and under normal conditions are less likely to become epidemic, than if they are introduced to new localities or if the conditions become considerably changed. This is because the relation of host to parasite is upset, the parasites having to accustom themselves to the new host, or the host having opportunities for rapid development which enable it to increase to a remarkable extent in spite of its parasites.

Extreme abundance of any insect pest is usually followed by a season of comparative scarcity, which is due to the development and increase in number of the parasites consequent upon the extreme abundance of its host or food supply. Later, other parasites may be bred from the eggs or the adult, and experiments will be tried by this Department as to ways for increasing the numbers of the parasites already known.

DEPARTMENTAL REPORTS

BRITISH HONDURAS: REPORT ON THE BOTANIC STATION, JULY 1900 TO DECEMBER 1902. By E. J. F. Campbell, Superintendent.

This report gives an account of the working of the Botanic Station, Station Nurseries and District Nurseries under the charge of the Superintendent.

The District Nurseries were started in July and August 1902 for the purpose of raising and distributing various economic plants. At Stann Creek about 1½ acres have been cleared, fenced and drained. Nursery beds have been prepared and seeds of cacao, Liberian coffee, etc. sown. A large number of trees have also been planted for the purpose of providing seeds. At Corrosal 1 acre has been treated in a similar way.

Efforts have been made to impart instruction in agriculture, and with this object a largely attended meeting of elementary school teachers was addressed by the Superintendent. The substance of this lecture is published as an appendix to the report.

TRINIDAD: ANNUAL REPORT OF THE GOVERNMENT ANALYST, 1902-3. By Professor P. Carmody, F.I.C., F.C.S.

During the year 1,918 samples were analyzed, of these 1,808 were official and 110 un-official. The samples analysed are divided into six sections—(1) revenue samples, (2) criminal cases, (3) sanitary (including waters, milk, foods and drugs), (4) agricultural and industrial, (5) miscellaneous, and (6) un-official samples.

Under the heading 'agricultural and industrial,' it is stated that analyses of milk from the Government Farm were made every week and the results are tabulated. Three samples of coal were analyzed for the Government and 174 samples of asphalt were examined in connexion with the Alsphalt Inquiry Commission. In the Educational Department eighty-seven students from the Royal and St. Mary's Colleges received the usual training in Theoretical and Practical Chemistry.

A report by the Government Analyst on the sugar-cane experiments is also published. The results of these experiments will be recorded in a future issue of the *Agricultural News*.

EDUCATIONAL.

School Gardens in British Guiana.

The Board of Agriculture of British Guiana has issued the following notice:—

Notice is hereby given that the Combined Court, at its next Annual Session, will be asked to vote on the Estimates for 1904-5, a specific sum for grants in aid of the establishment and maintenance of a limited number of school gardens in the colony.

Persons wishing to apply for such grants should send in their applications to the Secretary of the Board of Agriculture, not later than November 30 next.

The following note, from the Demerara *Argosy* of October 24, is interesting as showing that serious efforts are being made to put the teaching of agriculture upon sound and practical lines:—

The piece of land aback of Bourda Cemetery, facing New South Road, which has recently been laid out as a school garden, will shortly be opened for practical instruction in agriculture. It is proposed that the boys attending the object-lessons in 'Nature Teaching,' at present being given by Mr. T. Bruce-James, Agricultural Instructor, should receive tuition there.

IMPORTED STOCK AT ST. KITT'S-NEVIS.

The following extracts are taken from reports made by planters and others, who have taken charge of the stock imported into St. Kitt's-Nevis by the Imperial Department of Agriculture:—

Donkey Stallion: The half-blood donkey stallion ('Bismarck') has been in my charge on Cane Garden estate since his arrival in the island in January 1901. He commenced service this year and from January to August has served thirty mares from various parts of the island. I feel certain that the demand for him next season will be much greater and possibly more than he can cope with. His health is at present good and he looks well. (Mr. Wm. T. Maynard.)

Ram Goat: This lop-eared goat was in my possession for a few days, and was then, at my request, handed over to Mr. C. H. Huggins, as I considered that the intention of the Imperial Department would thereby better be carried out. Mr. Huggins, who keeps a larger herd of goats, has informed me that he is doing well and giving satisfaction. I think the lop-eared goat is the only ram in the herd. (Mr. C. C. Greaves, Nevis.)

Boar: This animal is in the charge of Mr. C. P. Esdaile. From a personal inspection I find that he is much appreciated and doing excellent work, but is not looking well. (The Hon'ble C. A. Shand.)

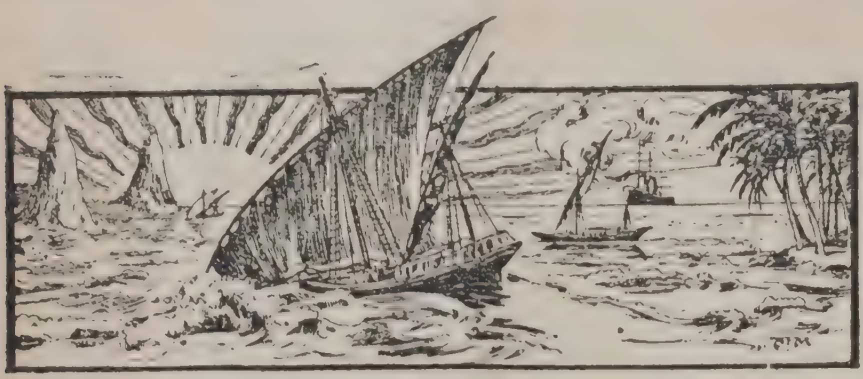
Reports have also been received with respect to the imported poultry. Plymouth Rocks, Wyandottes and Minorcas have all been imported, and it is reported that, on the whole, these birds have done well and that their eggs have been distributed all over the Presidency.

TURK'S CAP CACTUS.

Mr. W. N. Sands, Curator of the Botanic Station, Antigua, has forwarded to the Imperial Department of Agriculture a photograph of plants of the Turk's cap *(Melacactus communis)*, taken at Barbuda, to which island Mr. Sands was sent in March last on behalf of the Government. Mr. Sands writes as follows:—

Apart from the botanical interest and the different forms it takes, it may be mentioned that this cactus serves as food for deer, which abound on the island. I saw a number of large specimens which had been kicked over by these animals with the centre near the base eaten out.

The name Turk's cap cactus is given on account of a resemblance of the flowering portion of the plant in colour and shape to a fez cap.



GLEANINGS.

The first shipment of bananas from St. Vincent, under the auspices of the Imperial Department of Agriculture, was made by the R.M.S. 'Solent' on October 9.

The Imperial Department is making a determined effort to establish a trade in mangos with London, and every mail a small shipment is made. On Saturday last nine crates were shipped by the R.M.S. 'Tagus.' (*Barbados Daily News*, October 26.)

According to the *Gleaner* of October 19, two young bulls have been presented by His Majesty the King to Jamaica. They were expected to arrive in Jamaica on October 23.

In reply to a correspondent, the *Queensland Agricultural Journal* has the following reference to the use of sugar-cane as fodder: 'Sugar-cane is an excellent food for fattening pigs and other animals. Chaffed cane mixed with molasses will fatten horses and give them a glossy coat.'

We understand that an attempt has been made by the Imperial Department to cultivate a taste in London for our local pears, and that in furtherance of that object, a trial shipment of one crate of this fruit was forwarded per R.M.S. 'Tagus' on Saturday last. (*Barbados Daily News*, October 26.)

A case of cassava poisoning, we hear, is reported from St. Paul's. It appears that a family, by the name of Lespere, had for dinner on Saturday some cassava of a poisonous nature, and after eating they became ill, one of the children having died from the effects. (*St. Christopher Advertiser*, October 20.)

The growth of cotton in this island is all that could be desired. We have visited several allotments where the trees are bearing profusely, and a correspondent informs us that a fair return is promised to cultivators of cotton in the Windward District. (St. Vincent *Times*, October 15.)

At a meeting of the Antigua Agricultural and Commercial Society, held on October 2, the following resolution was passed :—

'That the Imperial Department of Agriculture for the West Indies, be respectfully asked by this Society to procure seeds, and influence the planting, of Eucalyptus species best suited to the various local conditions and circumstances of the island.'

Sir Alfred Jones has made proposals for the institution of a fruit planters' insurance scheme for Jamaica. In a letter to Mr. Chamberlain, Sir Alfred wrote : 'I do hope that my insurance scheme will be adopted—say, ½*d.* per bunch on all bananas exported, to provide a fund to be at hand in case of need. This would give something like £20,000 a year.'

According to the *Fruit Trade News* an experiment was recently conducted to test the shipment of Porto Rico fruits under refrigeration. Five hundred packages, containing grape fruit, oranges, limes and avocado pears were shipped in the refrigerator. It is stated that, with the exception of the avocado pears, all the fruit arrived in a perfectly sound condition.

A draft Forest Produce Bill has been prepared in Trinidad to be brought before the Council. It is proposed to give the Sub-Intendant of Crown Lands, or any person authorized by him, power to seize forest produce, which he has reason to suspect to have been obtained without a sufficient licence ; also to seize carriage, cart or beast of burden conveying such produce ; and to detain any person suspected to have been concerned in the obtaining of it.

An account is given, in the *Gardeners' Chronicle*, of September 19, of the damage done to the public gardens in Jamaica by the recent hurricane. 'The three gardens—Hill, Hope and Castleton—are practically wrecked. They look as if herds of savages had been let loose in them for the express purpose of destroying everything that they contained of value or of beauty. The careful labour of years was practically wiped out in a couple of hours by this fearful storm.'

The *Botanisches Centralblatt*, No. 37, contains a number of West Indian notes by Mr. W. G. Freeman. These include references to the publications of Mr. H. H. Cousins, Government Analytical and Agricultural Chemist, Jamaica, on 'Grass oil,' and 'Jamaica cassava,' in the *Bulletin, Department of Agriculture, Jamaica* ; Mr. J. H. Hart on 'The preparation of essential oils in the West Indies' (*West Indian Bulletin*, Vol. III) ; and the Hon'ble Francis Watts on 'Tables of Sugar Production.'

The exploitation of aloe fibre is to be taken in hand by an influential London company, which has made special arrangements for treating the raw material (says the *Anglo-Indian Review*). Southern India is to be planted to the extent of nearly 5,000 acres, while existing hedges along the railway lines from Lucknow to Benares have been leased to the promoters of the new venture. By the adoption of the latest methods and scientific machinery it is hoped that for the making of ships' ropes and cables aloe fibre may prove superior to manila. (*The Textile Mercury*, October 10.)

Early in May last it was brought to the notice of the Department of Agriculture that in the Singleton district of New South Wales the notorious weed, nut grass, was dying through the attacks of an insect parasite. Parcels of plants on which the insect occurred were despatched to residents in Queensland. The Government Entomologist had, however, taken steps to intercept them, being of the opinion that it would be injudicious to establish this insect until further information had been obtained as to its indentity and the degree of probability of its attacking other plants. (*Queensland Agricultural Journal* for August.)

THE REPTILES OF BARBADOS.

The following notes on the Reptiles of Barbados by Colonel H. W. Feilden, which appeared in the *Zoologist* for August 1889, will be of interest to naturalists in the West Indies:—

The island of Barbados emerges from the Atlantic Ocean, some hundred miles to the eastward of the chain of the Lesser Antilles, being separated from the islands of St. Lucia and St. Vincent, its nearest neighbours, by an oceanic depression of not less than a thousand fathoms; to the southward, between Barbados and the continent of South America, similar depths are found, whilst to the eastward it rapidly descends into the profound abyss of the Atlantic.

Geologically speaking, Barbados is a true oceanic island in the sense that it has not been connected with a continental area since the introduction of its present flora and fauna. A remarkable feature in the formation of Barbados is that no volcanic rock, so far as I am aware, protrudes through the basement series, which consists of sedimentary rocks, which are supposed to be either late Eocene or Miocene. Their exact age has not been satisfactorily determined, but they will in all probability be found to correlate with the rocks of Trinidad and the South American continent. Resting unconformably on these rocks, are deep beds of true oceanic ooze, similar, we may suppose, to those which cover the floor of the Caribbean and Atlantic areas, and on these oceanic oozes the coral covering of the modern island of Barbados has been built. It is therefore impossible to escape from the conclusion that the older Eocene or Miocene rocks, which now form the basement series of the island, must have participated in the prodigious downthrow of the Caribbean area, to a depth of at least 1,000 fathoms, in order to bring the floor of the ocean into harmony with its present depths. By no other train of reasoning can we account for the vast accumulations of oceanic ooze now resting on the oldest rocks of Barbados. When the process of upheaval, which brought the modern island of Barbados into existence, was sufficiently advanced, the reef-forming *Zoantharia* commenced building the coral-reefs, which, in the shape of coralline limestone, now form a capping over six-sevenths of the island, down to the sea-level, beyond which the same process of reef-building is still proceeding. The only portion of the island not covered by coralline limestone is the north-east section (Scotland district), where the coral-capping has been removed by subaërial denudation. The elevation of Barbados from the ocean, though intermittent, as shown by the numerous lines of old sea margins, rising one above the other, appears to have been progressive since the time when the structure of the coral polypes first emerged, and which at its highest point now stands at an elevation of over 1,000 feet above the present sea-level. If this outline of the geological structure of the island of Barbados be correct, its fauna ought to bear out the conclusions arrived at.

An examination of the reptiles inhabiting the island of Barbados points to their recent introduction. They are by no means numerous, consisting according to my investigation, of two species of snakes, four species of lizards, a single species of toad, and a tree-frog. The snake, *Liophis perfuscus* Cope, (P. Ac. Phil. 1862, p. 77), is an anomaly; for, so far as we at present know, the species is restricted to Barbados, and the transport of a snake by natural causes over a wide expanse of ocean offers considerable difficulties. The introduction and restriction of the venomous Fer-de-lance *(Craspedocephalus lanceolatus)* to two islands of the Antilles, namely, Martinique and St. Lucia, is another problem in snake distribution. The habitat of the species is the South American continent. There is a tradition in the West Indies that the Fer-de-lance was purposely introduced into Martinique and St. Lucia by the French planters, and turned out into the wilder parts of these islands to prevent their slaves marooning. I think this tradition may be exploded, from the fact that whilst searching for Carib implements in a valley deposit many feet in thickness, not far from Castries, I found, along with other pre-historic remains, a well carved representation of the Fer-de-lance, about 3½ inches in length. The Carib sculptor had utilized a piece of semi-fossil shell for the exercise of his art. This points to the snake having been an inhabitant of St. Lucia, long anterior to its occupation by the French. Two hundred and thirty years ago, when Ligon wrote his history of Barbados, *Liophis perfuscus* appears to have been extremely numerous, and though innocuous, very troublesome to settlers; he mentions how they were obliged, from its habit of crawling up through the windows of the dairies and drinking the milk, to build their milk-houses with projecting ridges to keep out these unwelcome intruders. At the present day, owing to the high state of cultivation, little harbour is left for snakes, and in a space of twelve months I only succeeded in obtaining two adult specimens and two young. The introduction and great increase of the mungoose must have assisted in the destruction of this snake, and it may be predicted that before many years have elasped, the species will be extirpated from the island.

The second species of snake, of which I only obtained a single specimen during my stay in Barbados, was submitted to Mr. Boulenger, who identifies it as *Stenostoma bilineatum* Schleg., known from Martinique and Guadeloupe. Mr. Boulenger remarks that the habits of the *Stenostomatidae* being very much those of earth worms, they may easily be transported in mould. This little snake is certainly very rare in Barbados; but its existence is known to some of the planters, for Mr. T. E. N. Dean, of St. Nicholas, mentioned to me that there was a second species of snake or slow-worm in the island—black and a few inches long—found generally under heaps of decayed leaves or litter, and that the coloured people call it the 'Seven-year snake,' as he or she who kills one is supposed to obtain remission of sins for a like period.

(To be Continued.)

THE PLANTING OF ORANGE TREES.

The following directions have been issued in the form of a circular by the Botanical Department of Trinidad:—

Plants should be placed at a distance of 12 to 15 feet apart. Where plants are to be established dig holes, 3 × 2 feet, and refill same with a mixture of earth and leaf mould or well decomposed stable manure. Holes, so filled, should be allowed to stand for a couple of weeks before planting commences. When transplanting be careful to remove plant from pot with a ball of earth attached. Should any roots be bruised on removal, prune same with a sharp knife. It is most essential that plants should not be planted too deeply in the ground. Place your plants at the same level that they were in the pots from which taken, and in the centre of each hole. Always shade plants newly planted out. Palm leaves do well for this purpose. Water well after planting, and keep well watered during dry weather. Mulching the ground around trees with a light dressing of stable manure or litter will greatly assist in retaining moisture in the ground during dry seasons.

WEST INDIAN PRODUCTS.

Spices and Drugs in the London Market.

The following article on the London Spice and Drug Market has been contributed by Mr. John R. Jackson. Mr. Jackson's last article appeared in the *Agricultural News*, Vol. II, p. 334:—

The drug markets opened in September, as was to be expected, with the continued dullness that usually characterizes them during the late summer months. This dullness was probably somewhat lengthened by the unsatisfactory condition of the weather, which induced those who could do so, to defer their holiday to as late a period as possible, in the hope of a favourable change. The disturbed state of Eastern Europe also had a depressing effect. Later in the month, however, business began to assume an improved or more normal condition, but nothing of any importance affecting any special product has to be recorded. With regard to those of West Indian origin, the following are the chief points:—

GINGER.

At the first auction there was a good supply of Cochin, which, however, met with a slow demand, medium and small, washed rough selling at 32*s*, while bold, rough cut and rather limed were bought in at 75*s*. No Jamaica was offered, but a week later 170 packages of Jamaica were put up against over a thousand packages of Cochin. Of these quantities 27 barrels of Jamaica sold at 37*s*. to 38*s*. for lean and dark and 45*s*. for good bright slightly mouldy. Of Cochin 40 packages were sold at the following rates:—30*s*. for washed rough slightly mouldy and 43*s*. for small mouldy native cut. Good small cut was bought in at 55*s*. and medium and bold at 70*s*. From this date to the end of the month there was but little or no demand for ginger of any quality and rates remained much the same.

PIMENTO, NUTMEGS AND MACE.

At the sale on September 2, pmento, mixed blacks, sold at 2⅞*d*. A week later 250 bags were sold at auction fetching 3*d*. for mixed and 3⅜*d*. for fair, while good fair sold privately at 3½*d*. At the end of the month the quotation was 4*d*. for fair quality.

Of nutmegs the first sale opened with a slight advance over the concluding one of the previous month, at the succeeding weekly sales the prices stood thus—on the 9th. West Indian 70's mixed dark, 1*s*. 8*d*.; Penang 63's, 2*s*. 7½*d*.; 66's, 2*s*. 5*d*.; 80's, 1*s*. 10*d*.; a week later West Indian nutmegs were quoted 86's, 1*s*. 6*d*. to 1*s*. 7*d*. At the close of the month the rates generally were somewhat higher.

Mace continued throughout the month at firm prices, West Indian starting at 2*s*. 3*d*. to 2*s*. 4*d*. for fair, 1*s*. 11*d*. for red and the same price for pickings. At this same sale fair Bombay sold at 5*d*. A week later the prices stood thus—fine pale West Indian, 2*s*. 11*d*.; the ordinary, 2*s*. to 2*s*. 1*d*.; while at the close of the month the following were the quotations—fine West Indian, 2*s*. 7*d*. to 2*s*. 8*d*.; good pale, 2*s*. 5*d*. to 2*s*. 6*d*.; ordinary to fair, 2*s* 3*d*. to 2*s* 4*d*.; red, 2*s*. 1*d*. to 2*s*. 2*d*.; pickings, 2*s*. to 2*s*. 1*d*. per ℔.

SARSAPARILLA.

At the first drug sale on September 3, one parcel only of grey Jamaica was brought forward and sold at from 1*s*. to 1*s*. 1*d*. per ℔. Six bales of Lima Jamaica were sold at 1*s*., and 15 bales of native Jamaica were disposed of at rates from 10*d*. to 1*s*. 2*d*. per ℔. for sea damaged. On the 17th. of the month, 9 bales of grey Jamaica were sold at from 1*s*. 1*d*. to 1*s*. 2*d*.; 1*s*. 1*d*. was asked for 9 bales of coarse, 4 bales of fair grey realizing 1*s*. 1*d*.; 29 bales of native Jamaica were brought forward and a few sold at steady prices, realizing 1*s*. 2*d*. for good bright red sound, 10*d*. to 10½*d*. for fair mixed and 7*d*. to 7½*d*. for sea damaged; 1*s*. 2*d*. was asked for fair grey Lima Jamaica, 9 bales of which were offered but not sold, and 10*d*. to 11*d*. was asked for 24 packages of somewhat coarse and chumpy. It may be noted that Mexican is exceedingly scarce and likely to be more so in consequence of the report of the raging of yellow fever in Mexico. The prices quoted are from 5¾*d*. to 6*d*.

KOLA.

At the first monthly sale, Ceylon and West Indian kinds were both offered and sold; the former dull, mouldy to fair, realizing 6*d*. to 6¼*d*. per ℔., while one half-barrel of West Indian mouldy fetched 2½*d*. In connexion with the trade in kola, the following note at this time may be of interest:—'The exports from French Guiana, during 1902, amounted in value to £3,422, of which £1,287 worth were shipped to France and the colonies, £77 to the United Kingdom and Sierra Leone, and £2,058 to other countries.' In the middle of the month some small, dark West Indian kolas were offered at 7*d*. per ℔.

CASSIA FISTULA, MUSK, LIME JUICE AND ARROWROOT.

Cassia Fistula, which is described as a scarce article in the market, was offered and sold at the sale on September 3, at 37*s*. 6*d*. per cwt. for fair West Indian.

Musk seed which is an irregular article of trade appearing only at intervals, was, at the sale on the 10th., quoted at 1*s*. 2*d*. per ℔. upwards.

Concentrated West Indian lime juice has been quoted during the month at £13 per cask of 108 gallons. A hogshead sold at £13 per pipe and 4 hhd. of palish West Indian unworked, realized 11*d*. per gallon.

St. Vincent arrowroot in the early part of the month was reaching 2*d*. per ℔. for manufacturing purposes, but at the close, when a large quantity of the same kind was offered, the price varied from 1¾*d*. to 2⅛*d*. per ℔., ordinary Bermuda fetching 1*s*., at which rates nearly 500 barrels of the former and 12 half-barrels of the latter were sold.

DAMAGED COCOA-NUT TREES IN JAMAICA.

We take from the *Gleaner* of October 14, the following report by Mr. W. Cradwick, Travelling Instructor, giving advice to owners of cocoa-nut trees damaged by the recent hurricane:—

I find that many of the cocoa-nut trees, which are apparently little injured by the late storm, have had the young and tender leaves badly damaged. Many of the damaged leaves are rotting and injuring the heart leaves, which are now trying to push their way through the battered and bruised leaves. In such cases, all damaged parts of the young leaves should be cut away, so as to prevent further rotting.

In many trees the leaves are so twisted and twined together that it is impossible for the young heart leaves to push their way out. The twisted leaves should be opened out, the rotten rubbish removed, and all dead leaves or dead pieces cut off, or they will cause the heart of the tree to rot.

Trees which have been blown down but not killed, should be got into a position as near as possible to that occupied by them before the storm. In attempting this, however, the roots must not be strained.

If part of the base which was formerly covered with earth is now out of the ground, it should be re-covered at once with good earth, and the roots will grow again.

MARKET REPORTS.

London,—October 13, 1903.—Messrs. Hales Caird & Co., Messrs. E. A. de Pass & Co., Messrs. Kearton, Piper & Co.; 'The West India Committee Circular,' October 12; 'The Liverpool Cotton Association Weekly Circular,' October 9; and 'The Public Ledger,' October 10, 1903.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 30/- per cwt.

Arrowroot—St. Vincent, 1¾*d.* to 3½*d.* per ℔. Bermuda, 1/- to 1/6 per ℔.

Balata—1/11½ to 2/6 per ℔.

Bees'-wax—£7 10*s.* to £8 per cwt.

Cacao—Trinidad, 66/- to 72/- per cwt.; Jamaica, 50/- to 64/- per cwt.; Grenada, 56/- to 65/- per cwt.; Dominica, 54/- to 64/- per cwt.; St. Lucia, 54/- to 64/- per cwt.; Demerara, 58/- to 66/- per cwt.

Cardamoms—Mysore, 1/4 to 3/- per ℔.

Coffee—Jamaica, 34/- to 118/- per cwt.

Copra—Trinidad, £16 5*s.* to £16 7*s.* 6*d.* per ton, c.i.f.

Cotton—West Indian, 5⅝*d.* to 6½*d.* per ℔.

Fruit—

- Bananas—Jamaica, 7/- to 8/- per bunch.
- Oranges—Jamaica, 12/6 to 16/- per case.
- Pine-apples—No quotations.

Fustic—£3 10*s.* to £4 per ton.

Ginger—Jamaica, 37/- to 65/- per cwt.

Honey—Jamaica, 19/- to 26/- per cwt.

Isinglass—West Indian lump, 2/3 to 2/10; cake, 1/4 to 1/8 per ℔.

Kola Nuts—4*d.* to 7*d.* per ℔.

Lime Juice—Raw, 10*d.* to 1/3 per gallon; Concentrated, £13 to £14 per pipe. Distilled Oil, 1/5; Hand pressed, 3/- to 3/3 per ℔.

Logwood—£4 2*s.* 6*d.* to £5. Roots, £4 to £4 10*s.* per ton.

Mace—2/- to 2/8 per ℔.

Nitrate of Soda—Agricultural, £10 per ton.

Nutmegs—75'*s* to 70'*s*, 2/- to 2/2; 90'*s* to 80'*s*, 1/7 to 1/10 per ℔.

Pimento—3⅝*d.* to 4*d.* per ℔.

Rum—Demerara, 9*d.* to 11*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.

Sarsaparilla—Jamaica, 1/- to 1/2.

Sugar—Crystallized, 15/3 to 16/6 per cwt., Muscovado, 11/- to 13/6; Molasses, 11/- to 15/- per cwt.

Sulphate of Ammonia—£12 7*s.* 6*d.* per ton.

Tamarinds—Antigua, 6/6 to 7/- per cwt.

Halifax, N.S.,—September 22, 1903.—'The Maritime Merchant.'

Bananas,—No quotations. Supply poor.

Ginger—Jamaica, 24c. pure bulk.

Hay—$13·00 to $14·00 per ton.

Molasses,—Porto Rico, 43c. to 44c.; Barbados, 39c. to 40c.; Antigua, 33c. to 35c.; Trinidad, 44c. to 45c.

Nutmegs—50c. to 60c.

Oranges—No quotations.

Pine-apples—$1·50 to $2·25 per dozen.

Potatos—New, 50c. to 60c. per bushel.

St. John, N.B.,—September 22, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 41c. to 42c.; Barbados, 38c. to 39c. per gallon.

New York,—October 2, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.

Cacao—African, 12½c. to 13c.; Caracas, 13¾c. to 14½c.; Jamaica, 10½c. to 12c.; Grenada, 13c. to 13½c.; Trinidad, 13½c. to 14½c. per ℔.

Cocoa-nuts—Trinidads, $19·00 to $20·00; Jamaicas, $22·00 to $24·00 per M.

Coffee—Jamaica, fair to good ordinary, 5½c. to 6¼c. per ℔.; Manchester grades, 8c. to 10½c. per ℔.

Ginger—Jamaica, 7½c. to 8½c. per ℔.

Goat Skins—Jamaicas, 50c. to 53½c. per ℔.

Onions—No quotations.

Pimento—7¼c. per ℔., ex store.

Rubber—No quotations.

Sugar—Centrifugals, 96°, 3⅞c.; Muscovados, 89°, 3⅜c.; Molasses, 89°, 3⅛c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—October 24, 1903.—Messrs. T.S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·40 to $3·75 per 100 ℔.

Cacao—$12·00 per 100 ℔.

Cocoa-nuts—$9·31 to $10·00 per M. (husked nuts.)

Coffee—Jamaica, $7·50 to $8·50; ordinary Rio, $9·00 per 100 ℔.

Hay—New Brunswick, $1·05 to $1·10 per 100 ℔.

Manures—Nitrate of soda, $57·00 to $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00 per ton.

Molasses—No quotations.

Onions—Madeira, $3·50 to $4·00 per 100 ℔.

Potatos, English—$3·00 to $3·31 per 160 ℔.

Rice—Ballam, $5·00 to $5·10 per bag (190 ℔.); Patna $3·50 to $3·60 per 100 ℔.; Rangoon, $2·60 to $2·80 per 100 ℔.

Sugar—No quotations.

British Guiana,—October 22, 1903.—Messrs. Weiting & Richter.

Arrowroot—St Vincent, $9·00 per barrel.

Balata—40c. to 42c. per ℔.

Cacao—Native, 11c. to 12c. per ℔.

Cassava—$1·00 per barrel.

Cocoa-nuts—$8·00 to $10·00 per M.

Coffee—Rio and Jamaica, 10c. to 11c. per ℔. (retail).
—Creole, 10c. to 11c. per ℔.

Dhal—$3·35 per bag of 168 ℔.

Eddoes—$1·32 per barrel.

Molasses—Vacuum Pan yellow, 15c. per gallon, casks included.

Onions—3½c. per ℔. Garlic, 6c. to 7c.

Pea Nuts—Curaçoa, 3¾c.; American, 5c. per ℔. (retail).

Plantains—20c. to 40c. per bunch.

Potatos, English—$4·00 per barrel.

Rice—Ballam, $4·60 per 177 ℔., ex store; Patna and Seeta, $5·65 to $6·00 per 177 ℔.
—Creole Rice, no quotations.

Sweet Potatos—Barbados, $1·44; Creole, $1·44 per barrel.

Tannias—$2·40 per bag.

Yams—White, $2·40 per bag.

Sugar—Dark Crystals, $1·97½ to $2·04; Yellow, $2·20 to $2·40; White, $3·50; Molasses, $1·70 to $1·90 per 100 ℔.

Timber—Greenheart 32c. to 55c. per cubic foot.

Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—October 22, 1903.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Venezuelan, no quotations.

Cacao—Ordinary, $13·50 to $13·85; Estates, $14·25 to $14·50 per fanega.

Cocoa-nuts—American, $16·00 per M.

Coffee—Venezuelan, 5½c. to 6c. per ℔.

Copra—$2·50 to $2·75 per 100 ℔.

Onions—$2·50 to $3·00 per 100 ℔.

Potatos, English—$2·75 to $2·88 per 100 ℔.

Rice—Yellow, $4·25 to $4·70; White Table, $5·40 to $5·80 per bag.

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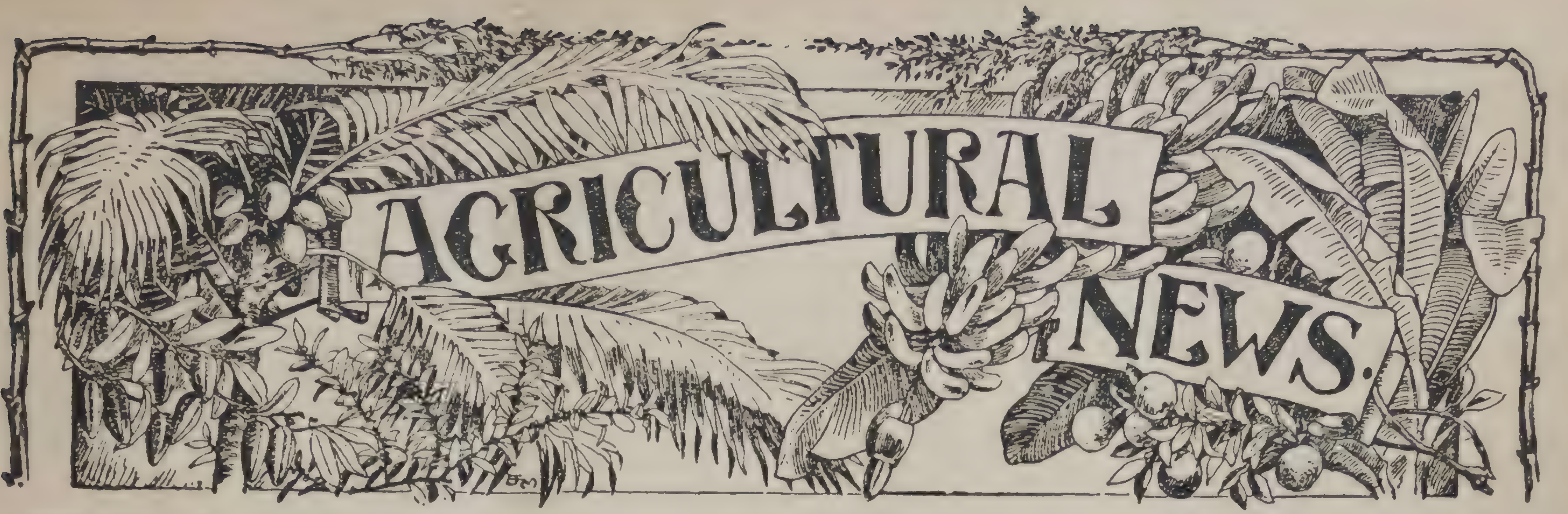
AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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The Utilization of By-products in Agriculture.

THE statement is frequently made that it is the by-products in the manufacture of any article that give the profit to the industry. While such a general statement is probably scarcely accurate, it is nevertheless true that, connected with many industries, there are valuable by-products which have come to be almost as important as the original article, and that upon the economical management of these much of the success of an industry depends.

In regarding the question of the utilization of subsidiary or by-products, the important place they hold in connexion with agricultural practice cannot be lost sight of. Turning to the chief agricultural fertilizers, it will be noticed that the production of many of these is essential to the production of some other commodity.

Sulphate of ammonia is a by-product in the manufacture of gas from coal. The 'ammoniacal liquors,' formed in this process, are distilled with lime, whereby the ammonia is driven off. The sulphate is formed by the absorption of the ammonia in sulphuric acid. In fact the 'ammoniacal liquors' of the gas works are the source of most of the ammonium salts of commerce.

The manufacture of steel from iron yields another important fertilizer. In this process it is essential that any phosphorus present in the iron should be removed, since steel, in which there is even a small proportion of phosphorus, is brittle. Formerly the phosphorus was removed by what was known as the 'acid' process, since silicic acid, or silica, was the chief agent employed in it. In 1879, a new process was invented by Messrs. Thomas and Gilchrist. This is called the 'basic' process, the agent employed being a base, lime, with which the walls of the tanks are coated. The process consists in first driving a blast of air through the molten iron, which causes the impurities to become oxidized. The oxide of phosphorus, thus formed, unites with the lime in the 'converter' to form phosphate of lime. This is placed on the market as 'basic slag' or 'Thomas' phosphate,' now one of the chief phosphate fertilizers. Yet it was not until some years after the invention of this 'basic' process, that the value of the phosphatic by-product as a manure was realized. In 1884, experiments were carried out with it in Germany, and from that time it has become more and more popular.

Similar examples of the utilization in agriculture of substances, at one time regarded as valueless, yet necessary, by-products, possibly of greater interest to planters in the West Indies, are to be found in the different oil-meals. These are the residues after the extraction of oil from the various oil-producing seeds. They include cotton seed meal, linseed meal, cocoa-nut meal, ground nut meal, etc. The oil-meals are utilized in agriculture both as fertilizers and feeding stuffs, being valued chiefly on account of their high nitrogen content. It will, however, be readily understood that the more economical way of using them is to feed them to cattle, and return to the soil the manurial residue, which will contain a considerable proportion of the fertilizing constituents of the seed. Under such circumstances a crop, like cotton, makes but small demands upon the mineral constituents of the soil, and is consequently regarded as being a less exhaustive crop, so far as these mineral constituents are concerned, than many other crops.

The utilization of oil-meals as food-stuffs suggests another instance of a cattle food manufactured from by-products. Reference has frequently been made in the *Agricultural News* to the recently invented food, 'molascuit.' In its manufacture a use is found not only for the molasses, especially at times when the price to be obtained for that article is low, but also for the bagasse of the sugar-cane.

The *Yearbook* of the United States Department of Agriculture for 1897, contains a very able article by Mr. H. E. Alword, Chief of the Dairy Division, on 'The utilization of the by-products of the dairy.' The principal by-products of the dairy are skim-milk, butter-milk and whey; and considerable attention has been paid both in Europe and the United States to their economical treatment. As the result of experiments it has been demonstrated that skim-milk forms an excellent food, especially for young animals and cows. Butter milk and whey can both be fed with most satisfactory results to cows, calves or pigs; although the former may be used as a human food and the latter as a source of milk sugar.

Another aspect of this question, of considerable importance in the West Indies, which can only be touched on here, is the utilization of surplus fruits. In an article in the *Yearbook* of the United States Department of Agriculture for 1898, the disposition of a crop of fruit and the prevention of waste are discussed at considerable length. In addition to the processes in common use—(1) evaporating, (2) canning, and (3) extracting the juice—the manufacture of spirits, vinegar, fruits, syrups, jellies, etc. is recommended. But here also the most common method of utilizing surplus fruits in the West Indies, at any rate, is for agricultural purposes, viz., in the feeding of live stock.

SUGAR INDUSTRY.

Cane-farming in Trinidad.

The following interesting account of the progress of cane-farming in Trinidad has been taken from Professor Carmody's recently issued pamphlet on 'The Industrial Resources of Trinidad.' Professor Carmody regards this system as one of the most promising features of the agricultural progress in the colony:—

It is not difficult to see what might have been the position of the sugar industry in this colony in the critical year just ended, if the timely and rapid development of cane-farming had not come to its aid. In 1895, cane-farming was of so little importance that it was merely referred to in my paper; now it has assumed proportions that will best be appreciated from a study of the following figures:—

Year.	Estate canes.	Farmers' canes.
1899	426,000 tons.	106,000 tons.
1900	364,000 ,,	106,000 ,,
1901	434,000 ,,	170,000 ,,
1902	338,000 ,,	185,000 ,,

It will be seen that one-third of the total crop of 1902 was grown by cane-farmers, and this proportion is not likely to diminish in future years. Under conditions more favourable than the present, it might even be considerably augmented. In my former paper I pointed out the advantages that follow from the central factory system of specializing both the cultivation and the manufacture. Cane-farming has contributed to this result in a manner and to an extent not then anticipated. But cane-farming, as at present practised, cannot receive unqualified approval. That it has materially assisted the sugar industry of this colony in a crisis of unusual severity will readily be admitted; but it cannot become a permanent part of the sugar industry, unless it is worked on sounder agricultural principles. The introduction of the present system of agricultural education into the primary schools may effect this.

Sugar-cane Experiments in Trinidad.

The annual report of Professor P. Carmody, F.I.C., F.C.S, the Government Analyst, has recently been published as Council Paper No. 73 of 1903. Results of analyses of thirty-nine varieties are given, showing the purity of the juice, yield, etc. Professor Carmody makes the following remarks on these results:—

In previous reports on these experiments the seedling canes have been classified on the basis of the saccharine richness of their juices. I have regularly pointed out in my reports that such a system of classification is misleading. For example, the cane with the richest juice this year would have been placed at the top of the list under the previous system: its true position is now shown to be twenty-fifth, with an average yield of less than half that of the Bourbon. The only reliable method of judging of the value of a cane is to ascertain the possible yield of sugar per acre, and this course has been adopted this year for the first time in the experiments with seedling canes in this colony.

The Bourbon indicated yield of 3·15 tons per acre—which is a normal yield for plant canes—has been taken as a standard. The only standard available for ratoons is the Caledonian Queen; but as the yield is higher than that from the Bourbon plants, the comparative value of the seedlings would be lower, if the Caledonian Queen were made the standard for ratoons. For this reason the Bourbon yield has been taken as the standard for all.

Thirty-nine varieties have been selected for examination. Of these only three give higher results than the Bourbon. One is the Caledonian Queen, giving the high yield of 130 per cent., and two seedlings, T. 182 and T. 87, giving 106 per cent. and 105 per cent. respectively.

B. 208 and T. 119 give 98 per cent. and 96 per cent. respectively. The others vary from 86 per cent. to 22 per cent. The two samples of Bourbon plants at the bottom of the list cannot be regarded as representative of this variety, as the yield of canes is below 4 tons per acre. The analyses were made on May 13, 14 and 15, 1903.

Central Sugar Factories for Antigua.

A special meeting of the Agricultural and Commercial Society of Antigua was held at Government House on October 19. His Excellency the Governor addressed the meeting upon the subject of the plans for the establishment of central sugar factories. We take the following extract from the Antigua *Standard* of October 24:—

On addressing the meeting, Sir Gerald expressed his pleasure at being back again in the colony and at having an opportunity of laying before those present the results of his labours of the past few months—labours directed towards the industrial prosperity of Antigua, in which all had borne their part.

He congratulated the gentlemen present and the community generally on the fact that the proposals for central sugar factories were in course of being realized.

As they were aware, there were two proposals now coming to fruition. Of the progress of the smaller one, concerned with the development of Bendal's into a well-equipped small factory, they had tangible evidence in the piles of machinery recently landed, and in the work of reconstruction which they could see in progress at Bendal's itself.

As regards the larger scheme, certain small residual difficulties of a legal character still remain to be adjusted. These concerned the contract for the supply of canes from one group of estates, and were due to the presence of encumbrances. It was expected that these adjustments would soon be effected, if they had not already been settled in England. The Government had, however, on its part, completed all that was necessary. The £18,500 contributed by the Government had been paid over before September 1, and Mr. Chamberlain's approval of the scheme and of the steps taken had been obtained.

Much of the success which had attended their efforts was due to abandoning schemes for very large factories, costing sums of money out of proportion to the resources of the colony, and by adopting the policy of moderate-sized ones, with a strict adherence to economy in all directions. Another element in securing success arose from their having the advantage of the wide technical knowledge of Mr. Watts, who had used every effort to secure improvements in sugar manufacture. When he (the Governor) arrived in the colony, he was wedded to the idea that the scientific improvement of muscovado sugar-making was the right policy for Antigua, but Mr. Watts made him realize that a central factory with its many economies was essential for the island's welfare. It was, however, the true policy now to recognize, that there is room for both, and that, probably, the circumstances of Antigua may better be preserved, if both modern factories and muscovado works are maintained in the island.

His Excellency then gave some details concerning the larger factory scheme, stating that the cane growers, who contract to supply canes, were to receive payments on account at the rate of the money equivalent of 4½ per cent. of 96° grey crystals f.o.b. Antigua, and that if, after working expenses, interest and reserve fund have been provided, profits admit of it, the payment for canes would be made up to 10*s*. per ton; after this, any further profits would be shared equally between the factory and the contracting cane grower.

In return for the Government's assistance there had been created deferred shares, which were held in trust by the Government; as soon as the debentures of the factory's company had been paid off, those deferred shares mature and would be allotted to the general contracting cane suppliers. Those shares represent one-half of the value of, and interest in, the factory and its business.

Reviewing the position, they had added 50 per cent. to last year's value of the contracting estates, and have two factories in view, one of which is already in course of construction, and the other assured. Then they had for the benefit of the peasant proprietors established a sliding scale, based upon terms which appear fair to all parties. Further, they were in possession of an object-lesson in organization tending to re-establish our staple industry and to give wealth and prosperity to the community,—an experiment which would be watched with the greatest interest and which, if successful, would be extensively copied not only in the Leeward Islands, but throughout the West Indies.

Phosphorescent Bacteria. An article by M. B. Issatchenko in the *Centralblatt für Bacteriologie* gives an account of some recent work by the author on the phosphorescent bacteria. An abstract of this paper appears in the *Botanisches Centralblatt*, Bd. XCIII, No. 40. With cultures of *Photobacterium phosphorescens*, the author has carried out certain experiments on the formation of chlorophyll in seedlings (oats, etc.), which proved that the light from the bacteria was sufficient for this purpose. The light emitted from the cultures was so intense that objects could be made out in a darkened room, and its spectrum could be investigated.

WEST INDIAN FRUIT.

THE CULTIVATION OF PINE-APPLES IN JAMAICA.

Mr. H. H. Cousins, M.A., F.C.S., Government Analytical and Agricultural Chemist, Jamaica, has recently reported to the Board of Agriculture on the results of manurial experiments with pine-apples. His remarks upon the position of the industry are full of interest. We take the following summary of the report from the Jamaica *Gleaner* of November 2:—

Despite the long association of Jamaica with pine-apples, it is only recently that any attempt has been made to grow these on a large scale and to establish an export trade with the United States and with England. The United Fruit Company have been the chief pioneers in this enterprise, and they, in common with all original founders of new industries in Jamaica, have taught the agricultural public certain valuable lessons at the cost of considerable expense to themselves.

The 'Smooth Cayenne'—the high-class pine of the Canaries—which commands the fancy trade, has been planted in Jamaica on a scale so large that the stock of this variety is at present commanded by the growers in Jamaica.

This pine is of vigorous growth and produces an enormous fruit with a fine head, and presents a magnificent appearance. It has been grown in Jamaica to a weight of 20 ℔. Such pines, however, are not appreciated in the English market. Their size frightens the buyers, whose ideas of a pine are limited to a fruit of some 8 ℔. in weight.

There has been a marked reduction in the export of pines from Jamaica during the past year, and this can only be taken as a proof of the fact that it has not been found possible to secure uniform results in the shipping of the fruit.

The two great difficulties attendant on the industry in Jamaica are (1) the serious effects of rain or any dampness of soil on the shipping qualities of the fruit, and (2) the tendency of the Smooth Cayenne to produce monstrosities on rich alluvial soils otherwise excellently adapted to the growth of pine-apples.

The late Mr. C. Eugene Smith, whose recent death has caused very general regret, found his returns to be greatly dependent on the weather. In a dry period the fruit would carry well, but, even a week or ten days after rain the results of shipment were often most disappointing.

The tendency of the pine in Jamaica is to fruit at the wrong season as regards the market and the weather. Special methods of planting and timing are necessary to secure the fruit ripening at the most advantageous season. This can be done, as it has been done with the banana.

There is still a future for the pine industry here, both a general trade in ordinary cheap fruit for the English market and a special and highly profitable trade in the fancy pine for the American as well as the English market. It means, however, a cultivation of a very specialized order, with risks of serious losses from time to time.

No results whatever from fertilizers were observed at any centre except Clover, near Mandeville, where the results were quite striking.

The Rowington results were not encouraging. It appears likely that after the heavy rains a good deal of surface rooting took place and that the plants suffered from scorching when the drought followed and the full sun beat down upon them later.

On the red soil from the limestone in St. Ann (Huntly), fertilizers produced no effect. This soil is apparently quite rich enough for pines without assistance.

At Barbican, on the light alluvial soil of the Upper Liguanea plain, fertilizers were quite inoperative. This soil is apparently richer than the maximum requirements of the pine in plant food.

At Billy Dun, on a similar soil with less humus and exposed on a hilly slope to intense heat, fertilizers were alike of no avail; the plants suffered greatly from scorching.

The experience of the Hon'ble Philip Cork, when he grew pines at Barbican, is in agreement with these results. Even enormous doses of fertilizers proved ineffectual when applied to the pines.

The phosphate fertilizers had absolutely no preventive effect on the formation of 'cockscombs' on the United Fruit Company's plantation.

At Clover, on the red soil of Mandeville, the pines were grateful for manure, and Mr. Palache has ascertained from the experiments that the complete manure, 2 cwt. sulphate of ammonia, 4 cwt. mixed phosphate, and 2 cwt. sulphate of potash, as applied to plot 2, gave the biggest fruit and fruit, of the best quality.

The analyses show that this soil is of low fertility compared with the others.

On the St. Catherine soil, 80 per cent. of the Smooth Cayennes may be expected to produce monstrosities. The high content of nitrogen (six times the normal and sixteen times that of the Florida soil) is undoubtedly one of the chief causes of this extraordinary vegetative exuberance.

The selection of soils for pines is still a matter about which we have a great deal to learn in Jamaica.

COTTON.

Cotton Cultivation in the West Indies.

Our Western Empire, of October 15, has the following reference to the cultivation of cotton in the West Indies:—

The recent visit of Sir Daniel Morris to the Southern States for the purpose of studying the cultivation and treatment of Sea Island cotton will doubtless be of great service. However desirable it may be for the West Indies to cultivate a substitute for the cheaper varieties of cotton exported from America, the chief strength in the future will lie in that specialty of finer, long-staple cotton corresponding to Sea Island, which was originally introduced to the United States from the West Indies, and which can be produced in those colonies better than anywhere else in the world. The importance of fostering supplies of cotton within the Empire has been proved more strongly than ever during the last month by the terrible distress in Lancashire, to which our work-people are always liable, being at the mercy of American financiers.

Cotton Cultivation in Montserrat.

The following communication from Mr. A. J. Jordan, Agricultural Instructor, Montserrat, on the position of cotton cultivation in that island will be of interest:—

Over a ton of cotton seed has been distributed from the Grove Station, Montserrat, to sixty-three persons during the months of July, August and September.

About 700 acres have been planted and despite the ravages of the cotton worm and the leaf blister-mite, preparations are already being made to increase the area next season.

It is estimated that there are about 10,000 acres of land suited to the growing of Sea Island cotton in Montserrat, and with a three-years' rotation this would enable planters to have over 3,300 acres annually in cotton.

From experiments it is evident that with a good supply of Paris green at hand, the cotton worm can be kept under, and as far as can be ascertained from some small experiments in progress at Grove Station, it appears that the leaf blister-mite can be kept in check by the application of sulphur and lime. Five different compounds are being tried upon affected plants, and while in the other cases the disease has steadily gained, there is less disease now than at the commencement of the experiment on the plants treated with sulphur and lime.

About 5,000 lb. of lint of the present season's crop have been shipped from Trant's estate to the British Cotton Growing Association.

Cotton Planting in Antigua.

The planting of cotton is strongly advocated in the Antigua *Standard* of October 31. After reference to the scarcity of this product in England, the article continues:—

We have, through the instrumentality of Sir Gerald Strickland, secured the assurance of financial help from the Imperial Exchequer for the promotion of the cotton industry in this island. We have also the sympathy and material aid of the British Cotton Growing Association, and the immediate oversight and propaganda of the Imperial Department of Agriculture in all its ramifications and with its well equipped staff of scientists and able officers. If the peasant cultivator be desirous of trying the planting of cotton, he will be able to dispose of it for ready cash at the cotton factory, which will soon be erected at the 'Boer Camp.' And we may say here, that his Excellency the Governor has in public stated that the Imperial loan of £4,000 or £5,000 for the encouragement of cotton planting will be appropriated, preferably, in aid of the peasantry, and of overseers and managers, who have the privilege of cultivating plots on the estates where they are employed as such. This is not the least important point to be remembered, nor are the advantages of such an arrangement to be despised. Therefore, we remind those of the three classes mentioned, under whose observation these lines may come, that Mr. Watts is prepared to hear any suggestions for formulating a scheme of allotment and for repayment of loans on the basis of £2 per acre.

Sea Island Cotton.

The following interesting account of the superior quality of Sea Island, as compared with Egyptian and other cottons, is taken from a report by Mr. George P. Foaden, on a visit to the cotton-growing States of America, which was issued as Vol. V, No. 4, of the *Journal of the Khedivial Agricultural Society and the School of Agriculture* of Egypt:—

This is without doubt the finest cotton grown in the world. It is grown in America on a few small sandy islands off the coast of South Carolina and Georgia; and on low lands near the sea in these States, as well as in Florida. It cannot be raised successfully inland, as the quality greatly deteriorates. The plant is not a heavy yielder and the small amount of produce obtained has to be compensated for by quality. The standard of excellence at present reached has been obtained by a careful system of selection, as well as by the system of cultivation adopted. The total production is very limited, not exceeding 400,000 Kantars (about 1,785 tons) out of a total of 50 or 55 million Kantars (approximately 2,300,000 to 2,500,000 tons), which may be taken as an average American crop. This cotton, with Egyptian, supplies the bulk of the long-stapled cotton of the world. The fibre is very long, varying from 1½ to 2½ inches, is creamy brown in colour, but much less brown than Egyptian cottons. It is very fine, strong and silky, with a comparatively regular twist. The cotton is used for thread, lace-making and for very fine counts of yarn from 120 and upwards to as much as 400, and even more in exceptional cases. Where a very strong fibre is required for heavy yarns this cotton is also used, as for example for sail cloth, linings of bicycle tires, etc. It is now employed for making mail bags in the United States. This cotton, unlike the ordinary American cotton, which possesses seed covered with short lint, and is white in appearance, has clean black seed similar to Egyptian and is ginned similarly to our cottons by the roller-gin. Great care however is taken in handling in order to put the cotton on the market perfectly clean; quality and cleanliness being the leading considerations. Quantity is a secondary consideration, and with the higher grades of cotton this should always be so, as when the quality deteriorates, they simply fall into line with, and consequently into competition with, the lower grades, of which there is a more abundant supply.

BEE-KEEPING.

Honey in England.

The following summary of an address delivered at Sydney, by Dr. R. Hamlyn-Harris, D.Sc., F.E.S., formerly Honorary Assistant Entomologist to the Imperial Department of Agriculture, is taken from the August issue of the *Agricultural Gazette of New South Wales.* Dr. Hamlyn Harris' remarks, though applying primarily to Australian honey, should serve as a warning and be of interest to West Indian bee-keepers:—

In the first place, one of the most important points touched upon was the faults and errors in the past samples of honey that had been sent from this State to the home market, with suggestions as to remedying them. In England, the best and largest buyers require regular quantities, and these should be of a uniform quality. When consumers repeat an order, the repetition of an order means a repetition of goods formerly supplied, more especially in the flavour thereof. Therefore, for export purposes, Australian honeys should be graded into uniform samples, and with these samples an assurance should be given that a regular supply can be kept up. One fault with much of the honey that has been placed upon the home market is that it is the usual thing here to extract when about two-thirds or three-fourths of the cells are capped. It appears that honey that has been extracted under these conditions, has more or less fermented on the voyage home. The advice was tendered that, instead of waiting for the natural ripening process to be effected, recourse should be had to ripen it artificially. It is rather exceptional to find a large frame of honey in the condition of having everything fully capped. It appears that in shipping honey, a little unripe honey will cause the whole bulk more or less to ferment. It is the 'little leaven' over again. Australia is not the only country that has sent to England honey that has fermented, but she appears to be the greatest sinner in this respect. Perhaps our honey when shipped, having to pass through so many climatic changes, requires to be more carefully ripened than that of other countries. Honey thoroughly ripe, if we are to do anything in the export trade, must be insisted upon.

Another important factor in honey shipped to England is the need of thoroughly freeing it from impurities, such as pollen and portions of the bee anatomy. Honey containing these and other foreign matters quickly ferments. Chilian honey arrives in England containing quantities of the foregoing. It is very dark, and of a decidedly strong flavour, nevertheless it is bought up readily at 3*d.* per ℔. This honey is generally bought by chemists, who, after some treatment, blend it with good flavoured honey, and then sell it as pure English honey at 1*s.* per ℔. I have not the slightest doubt that that is how our honey is often treated. The demand for honey in the English market is on the increase. There is now greater competition than formerly; no doubt this will have a tendency to lower the price of the article.

SCIENCE NOTES.

Hybrid Mangos.

In a former issue of the *Agricultural News* (Vol. II, p. 276) we reproduced an article from *Indian Planting and Gardening* on the improvement of Indian varieties of mangos. The author suggested that steps should be taken, by hybridizing and selection, to improve the existing varieties.

In this connexion it is interesting to note that the mango, like the orange, exhibits the phenomenon known as polyembryony, that is, the seed contains more than one embryo. The phenomenon is not common and is an extremely interesting one.

As is well known, the embryo-sac of a flowering plant possesses at its micropylar end three cells, the two synergidae and the egg-cell; at its opposite end are the three antipodal cells, and in the centre is the large secondary nucleus of the embryo-sac. When fertilization occurs, one of the male cells from the pollen tube fuses with the egg-cell, and sometimes the second male cell fuses with the embryo-sac nucleus (the so-called double fertilization). From the fertilized egg-cell is developed the embryo, and from the embryo-sac, the endosperm arises. When cross-breeding is attempted the male cell and the egg-cell are from different varieties, and naturally, the embryo, which developes from the cell formed by their fusion, shows the properties of both parents, that is, it is a hybrid.

In cases where polyembryony occurs, however, the extra embroyos are usually formed from cells of the nucellus, lying altogether outside the embryo-sac. These cells become filled with protoplasm, swell up and divide; the tissue formed projects into the embryo-sac and develops into an embryo. As several cells of the nucellus grow out in this way, we get several embryos in the embryo-sac, of which only one is developed as a result of a process of fertilization, the others being formed by a purely vegetative process of budding. Generally, moreover, the normal embryo does not develop, being prevented from doing so by the more vigorous growth of its adventitious rivals. Strasburger, who was the first to work out this phenomenon, remarks in his *Text-book of Botany* (English Edition, p. 279): 'The adventitious germs in the polyembryonic seed are, however, so far dependent upon sexual reproduction, that for the most part they only attain their development in case fertilization has previously taken place; but in *Coelobogyne*, one of the Australian Euphorbiaceæ, of which usually only female specimens are found in cultivation, the adventitious germs develop without the stimulus of fertilization.'

It will thus be seen that the prospects of improving mangos by hybridizing are not very promising. At most, only one of the numerous embryos developed from each seed would be a hybrid. Probably they would all be adventitious, and if one were a hybrid it would probably not be distinguishable from the others until the tree was bearing fruit, and then the chances are that it would not be superior to the others.

The Organic Acids in Plants are valuable mainly because they impart palatability to foods and exert a favourable influence upon digestion by stimulating the excretion and flow of the digestive fluids. Many of the organic acids have medicinal properties, for example, citric acid; and others, as oxalic acid, are poisonous. They cannot be considered as heat or flesh-producing nutrients, but simply as food adjuncts. (Snyder in *The Chemistry of Plant and Animal Life.*)

TORONTO EXHIBITION, 1903.

A report on the Toronto Exhibition by Mr. Whitfield Smith, Travelling Superintendent on the staff of the Imperial Department of Agriculture, was published in the *Agricultural News* (Vol. II, p. 325). Reference will also be found to the West Indian exhibits on pp. 279 and 329. The following letter, dated October 9, has been received by the Imperial Commissioner of Agriculture from Mr. C. S. Pickford, of Halifax, to whose untiring energy much of the success of the West Indian exhibits is due:—

In regard to the Toronto exhibit, we had a visit from Mr. Whitfield Smith who took, as he told me, full notes of the exhibits for the purpose of making a full report to you in connexion with the *Agricultural News*. I therefore did not do so myself. If you should need this from me, after getting Mr. Smith's report, I shall be most happy to send you same. According to the opinions expressed by all who saw the exhibit, it was a credit to the West Indies; it occupied floor space of 1,300 square feet and was to my mind fully representative of West Indian products. We missed fruit from Dominica, of which none came to hand. Palm leaves and cocoa-nuts were a great help in making the show attractive. The total attendance at the fair was in the vicinity of half a million people, and on one day alone over 90,000 paid for entrance. Our building on the main thoroughfare, just three buildings from the main entrance, was in the right position to catch the crowd. We had numberless inquiries regarding the products exhibited, and it is my opinion that this kind of show of West Indian staples is a great big advertisement for the West Indies in Canada, and should be productive of great good. As I wrote you before we had visits from a number of gentlemen from the West Indies who all appeared pleased with the showing made at the big fair by their native land.

I expect to be awarded a medal and diploma for the show as a whole. All goods have been stored in bond at Toronto, and with a few additions of, say, fruits, cocoa-nuts and palm leaves, with other samples that might be sent, will do well to show next year, should it be decided to do so. I have received permission to leave the stands in place for next year, so that a large item in the expense of putting up would be saved.

ARBOR DAY IN ANTIGUA.

It will be seen from the following extract from the Antigua *Standard*, of October 31, that every effort is being made to render Arbor Day a success in that island. We hope that similar efforts will be made in other West Indian Islands:—

The celebration of Arbor Day has been fixed for Monday, November 9, the King's birthday. The occasion will, as far as lies in the power of the Committee having charge of the arrangements, be made one of interest and popular enjoyment; there will be functions in the various parishes of the island; and in St. John's there will be a continuation of the planting commenced last year. We are requested by the Committee to extend an invitation to all readers of the *Standard* to lend their aid in making the occasion at least as great a success as it was last year.

THE 'AGRICULTURAL NEWS.'

We take the following extracts from an appreciative article which appeared in the Jamaica *Gleaner* of November 2:—

One of the good things done by the Imperial Department of Agriculture for the West Indies is the establishment of the *Agricultural News*, a fortnightly publication devoted to the interests of agriculture in the West Indies, and published at the headquarters of the Department, Barbados, every alternate Saturday. We have carefully read this paper from the first issue to the last, and as the result of this acquaintance with it we do not hesitate to say that, for the purpose in view, it would be very difficult to produce anything better. It is adapted to the needs of readers, whether they belong to the class of large or small planters. It is not intended specially to promote the interests of agriculture in Barbados or any other colony in particular, but those of the whole of the West Indies; and as the British subjects and English-speaking people in this part of the world number more than a million and a half, and live by the cultivation of the soil, the object the publication aims at is one of the very greatest consequence. It is nothing short of the social, economic and, in the end, the political well-being of this large population. It is the improvement of this first of industries by the steady and the widest diffusion of the knowledge most needed in these days when science is revolutionizing all agricultural methods, when the chemist in particular is letting in new and true light of infinite value on every form of culture. This small penny publication, edited and contributed to by those who have no axe of their own to grind, nothing personal indeed but their own reputation for sound teaching on the subject of agriculture, and whose services are wholly devoted to the general welfare, should command a wide circulation. We understand that it already does so to a considerable extent, but not to the extent it deserves. It should be found everywhere telling of what is being done and should be done to improve the handling of the soil and the plants by which the mass of the people live.

As a minimum of technical phraseology is employed, and the forms otherwise used in setting forth the information, of which the paper is full, are of a popular character, the *Agricultural News* is a people's agricultural journal. The reader gets the news in a form that makes it easy of assimilation. The fortnightly fragments get pieced together in his mind, and he begins to be interested not in one form of agriculture but in all the actual, and indeed in all the possible, forms suited to the West Indies; his view extends beyond his own parish or island and takes in the whole West Indian field. The wider view is sure to be the sounder view, and in the end the more useful. Till within recent years the colonies lived largely apart. The Imperial Department of Agriculture has done more than any other agency to bring them together and to lead them to realize their community of interest and, still more, their community of hope for the future. The annual conferences held by the Department have done much that tends in this direction, and this fortnightly paper, conducted in the spirit and with the aims of the conferences, is bound to carry the uniting and informing influence into every corner of the field. It deals with the main subject in every aspect—with the old commercial and the new educational aspects, as well as experimental agriculture, tillage, harvesting, preparation for local, English, American and other markets. Considering its aims, the work it has already done and what it evidently can do, the *Agricultural News* deserves to have its circulation increased tenfold.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 351 of this volume.

The 'Agricultural News': Price 1d. per number, post free 1½d. Annual subscription payable to Agents 2s. 2d., post free 3s. 3d.

Agricultural News

Vol. II. SATURDAY, NOVEMBER 21, 1903. No. 42.

NOTES AND COMMENTS.

Sea Island Cotton Seed.

It is desired to draw the attention of Curators of Botanic Stations and other officers of the Imperial Department of Agriculture, as well as of cotton planters throughout the West Indies, to the announcement with reference to Sea Island Cotton seed on p. 379 of this issue. It will be seen that orders for this seed should be sent in immediately in order to avoid disappointment.

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Maragogipe Coffee.

Reference was made in the *Agricultural News*, Vol. II, p. 316, to trees of this coffee at Plaisance estate, Grenada. It is desired to make a correction: the name should have been written 'Maragogipe.' A note on this variety of coffee will be found in the *Kew Bulletin*, 1894, p. 163, where the following description is given: 'This large-growing variety of Arabian coffee was found in Brazil. It is large and vigorous looking, having, at first sight, much of the habit of Liberian coffee. The leaves, though fully twice the size of those of Arabian coffee, have, however, the papery texture and the undulating character distinguishing that species. The flowers, also, are the flowers of *C. arabica*, and so are the cherries, except in size. When first introduced Maragogipe coffee was described as follows: "It grows with extraordinary vigour, and trees three to four years old were already 8 to 10 feet high and full of fruit. The tree seems to come into full bearing much sooner than the ordinary coffee and the bean is very much larger; the weight of coffee per acre must be very much more than from the ordinary coffee tree." '

Manurial Experiments in Jamaica.

The *Gleaner*, of November 2, publishes a summary of a report by Mr. H. H. Cousins, the Government Agricultural and Analytical Chemist, on the results of manurial experiments carried out during the past year.

The experiments have throughout been controlled by a uniform system of soil analysis, and have afforded striking evidence of the value of soil analysis, when carried out in a strictly uniform and comparative manner.

In several districts the experiments resulted in failure owing to drought; this experience should cause planters to consider carefully the risks before entering upon any considerable expenditure on fertilizers.

The experiments have, however, brought out most clearly the great reserves of fertility in the soils of Jamaica. In most cases there have been no results from the use of fertilizers, the soil being rich enough to produce the maximum crop possible under existing conditions. There is no doubt, however, that most of the soils are limited, as to yield, by the rainfall, and that with irrigation there is a possibility of great agricultural development.

In concluding this introduction, Mr. Cousins emphasizes the fact that the needs of the soils in Jamaica are rather cultural than chemical.

◆

Pressing of Sea Island Cotton.

In consequence of the system by which steamship companies charge freight according to cubic measurement, endeavours are made to compress cotton into as small a space as possible. There appears, however, to be a risk of injuring the fibre by too severe pressure.

Mr. Walter S. Vaughan, of Dominica, has written to the Imperial Commissioner of Agriculture that, when visiting the cotton factory at Barbados, he remarked on the large measurement of the bales packed for shipment. He had written on the subject to Messrs. Hanmer & Co., of Exchange Street, Liverpool, who sold some West Indian Sea Island cotton last July, and had received the following reply:—

'As to probable injury to this class of cotton by hard pressure, this has not been tested. Georgia Sea Island cotton is pressed lightly, but each season it is being pressed a little tighter. The latest fashion is to iron hoop the bales. Average weight about 3 cwt. 3qr.—gross dimensions 5¼ x 2⅓ x 2¼ feet—about 27 cubic feet. Soon they will be pressed as hard, or nearly so, as American bales, but wrapped with finer canvas.'

Mr. J. R. Bovell, Agricultural Superintendent at Barbados, writes as follows in reference to this matter:—

'So far as I could ascertain when I was in the States, short staple or Upland cotton was pressed more than the long staple or Sea Island cotton. This was particularly so in the Sea Islands where the very best long staple cotton is grown. On the other hand, in Georgia, where the staple of the Sea Island is not so long, the bales are, as stated by Mr. Vaughan, pressed more and are about the same size and weight as those he mentions.'

Planting of Rubber Trees in Dominica.

Reference has been made in the *Agricultural News*, Vol. II, pp. 278, 312, to samples of rubber sent from Dominica, and to the possibility of building up a trade in this product. Interesting extracts from the report of the Administrator appeared in the *India Rubber Journal*, of October 26.

From these it appears that great interest has been taken by the planters in a small experiment plot of rubber near Corona. The Administrator points out, however, that further trials must be made by planters to ascertain whether rubber planting will be profitable in Dominica on a commercial scale. It is thought that much of the land along the Imperial road is suited to this cultivation, and further experiments are being conducted by the government. Three acres are to be planted with Castilloa, Para and Lagos silk rubber with a view to ascertaining the kind of rubber best suited to Dominica. Rubber trees are also being planted for 9 miles along the Imperial road, the proceeds of which after seven or eight years will, it is anticipated, provide for the maintenance of the whole road.

Agriculture in the Canary Islands.

It is stated in the *Consular Report* on the trade of the Canary Islands for 1902, that the most promising feature in the trade of the islands was the extraordinary increase in the cultivation and export of bananas. The fears that were generally expressed with regard to this trade, in consequence of the facilities offered to Jamaica shippers, have not been realized. The total quantity exported to the United Kingdom in 1902 from all the islands was 1,656,876 crates, valued at £284,320.

A large and increasing trade is done in tomatos and potatos. Two sorts of onions are cultivated—white and red, the latter chiefly in Teneriffe. The major portion of the onion crop of 1902 was shipped to the West Indies.

It is stated that the increasing demand for bananas and tomatos is causing attention to be given to the question of irrigation. 'It is estimated that in Teneriffe there are 100,000 acres, which are at present uncultivated, and which could, if irrigated, be devoted to the cultivation of bananas, tomatos and potatos. According to the opinion of experts, the expenditure of large capital on irrigation works would be profitable to the investors, and would ensure a rich and prosperous future for the islands.'

The Sterilization of Cotton Seeds.

Dr. A. Stutzer in the *Revue des Cultures Coloniales*, for October 5, gives the result of some interesting experiments made by M. Kehler at his request; these formed the subject of a report of the German Colonial Society and were first published in the *Tropenpflanzer* of July 3.

The experiments, which were made on five samples, were for the purpose of determining the action on the seeds of corrosive sublimate, when used to destroy disease-producing spores. One sample of Cameroon and four of American seed were tried but, on account of the low germinating power of the Cameroon seed, the experiments were continued only with the American variety. Seeds were immersed for thirty minutes in solutions of one in five hundred and one in a thousand, and were then placed directly in earth kept permanently moist. At the same time seeds soaked in ordinary water, were planted. As the result of the four experiments, in four days 69 per cent. of non-sterilized and 74 per cent. of the sterlized seeds had germinated, and in eight days 78 per cent. of the non-sterilized and 81 per cent. of sterilized had germinated. The author in conclusion advises that a solution of one in a thousand be used if large quantities are sterilized, and that the seeds be washed in water after sterilization to prevent the poison penetrating into the seed.

The St. Croix Central Sugar Factories.

Mention has already been made in the *Agricultural News* (Vol. II, p. 214) of the dissolution of the St. Croix Central Sugar Factories Company and the floating of a new company for the purpose of taking over the machinery, etc. We are indebted to Mr. V. Hänschel, Danish Consul at Barbados, for the following additional information:—

'I can now advise you that the company which was projected, to take over this factory and work, could not be formed, as the necessary capital for working was not forthcoming. A solution has however been found by the Danish Goverment applying to the Danish sugar factories (De Danske Sukkerfabrikker), a joint stock company working all the beet root factories as also the sugar refineries in Denmark, a very strong and successful company, requesting them to take over the working of the St. Croix sugar factory, temporarily for two years, guaranteeing them against the risk of any loss they may incur.

'It is hoped that the technical knowledge as well as the mercantile advantages possessed by the Danish sugar factories, in connexion with their long experience, will greatly facilitate the solution of the difficulties under which the St. Croix factory has been working: the company possess, moreover, ample means. After the lapse of two to three years it is expected that the company may then either continue the industry or be enabled to make practical and acceptable proposals for the reconstruction. The company have, at a General Meeting held in September last, agreed to undertake the management and working of the St. Croix factory which is therefore entering upon a new era of what is confidently hoped may be one of prosperity.

'The Danish Government have during the many years the St. Croix factory was being worked for their account had a surplus of about £28,000 on the working expenses, but have received no interest on the capital they contributed, which was about £80,000 (not £100,000 as I stated in my previous letter). It must be borne in mind that private shareholders contributed an equal sum.'

INSECT NOTES.

The Cotton Worm in the United States.

Mr. J. R. Bovell, F.L.S., F.C.S., who has just returned from a visit to the United States, informs us that the cotton growers there have little fear of the cotton worm. The use of Paris green is commenced as soon as the small caterpillars appear, and thus serious damage is prevented.

Dr. L. O. Howard, in his 'Insect Book,' mentions that in one year Mr. E. A. Schwarz, of the Division of Entomology of the United States Department of Agriculture, found, while studying the habits of the cotton worm, that about 75 per cent. of the worms were killed by parasites.

These facts may furnish encouragement to West Indian planters; for prompt action on their part and the aid of the parasites, which will probably increase from year to year, should prevent any serious injury except in occasional severe years.

Extreme scarcity of any insect, which serves as host for a parasite, results in a season of scarcity of the parasite, which gives the host a chance to increase again. This increase in host is always followed by a corresponding increase in parasites, which finally become so numerous as nearly to exterminate the host.

Even in the United States, where the cotton worm and its parasites have been in constant inter-relation for many years, there are occasional seasons when the cotton worm is unusually abundant, and does considerable damage to the cotton crop.

The Cotton Worm.

The St. Vincent *Sentry*, of October 23, has the following note with reference to specimens of the cotton worm, in all its stages, to be seen at the Agricultural School in that island:—

> In our last issue we reproduced from the *Agricultural News* an article giving the description of the pest which has attacked the cotton fields of Barbados, our object being to disseminate information which should, in the event of the cotton worm appearing in St. Vincent, prove advantageous to cultivators. We are pleased to learn that, with the same object in view, specimens of the cotton worm, its pupae and moths are now preserved at the Agricultural School here, and the Resident Master will be glad to show them to any one calling there on any day between 7 a.m. and 1 p.m. As a glance at the worm itself is much more valuable than reading the description, we advise those interested in cotton cultivation to see the specimens, so as to be able at once to detect the presence of the pest and thus be in a better position to cope with it.

It may be mentioned that specimens of the cotton worm are also to be seen at the Planters' Hall, Bridgetown, Barbados.

Cotton Leaf Blister-mite.

The Hon'ble Francis Watts writes suggesting that the following method of dealing with early attacks of leaf blister-mite (*Eriophyes gossypii*) based chiefly upon suggestions made by Mr. Lunt, Curator of the Botanic Station, St. Kitt's-Nevis, might be recommended:—

> The weeders, or others working in fields of cotton, should carry with them bags of close material, such as linen drill, and be instructed to pick and carefully place in the bag any leaves or other material seen to be infested with leaf gall. The bags should be carried out of the field with care to avoid spreading the infection, and on arriving at a convenient spot should be plunged into boiling water and left there for an hour before their contents are removed.

PRINCIPLES OF DRAFT.

King writes as follows in his *Physics of Agriculture* of the principles underlying the draft of a horse:—

> When a horse has a muscular development and a type of skeleton which permits him to utilize his full weight in hauling, then the direction of the line of draft, or of the traces in pulling, exercises an important influence upon the amount that the horse can draw.
>
> If the traces are sloping it is clear that there will be less tendency to tip the horse up, and hence the greater the slope of the traces, the more will be required to raise the horse from his front feet; at an angle of 18° to 20° the weight of the horse will permit him to draw double what he can with the traces horizontal. If the traces are carried above the horizontal, then the horse tends to be raised from his feet more easily, and his draft will be decreased. In the case of a horse weighing 1,645 ℔., a measured standing draft of 1,250 ℔. has been recorded, when the traces slanted at an angle of 22,° and of 1,120 ℔. with them horizontal. It is doubtful if any of the heavy draft horses are able to utilize their full weight in hauling, except when the line of draft is above the horizontal.
>
> Weight in a draft horse is as important a factor to his service as it is in a locomotive; there must be weight enough to make a secure footing. That is to say, of two horses, each having a muscular power capable of utilizing its full weight, the heavier one will exert the stronger pull. The 1,200 ℔. horse may pull about 200 ℔. more than the 1,000 ℔. horse of like build, when the traces are horizontal, and 400 ℔. when the traces slope at an angle of 20.°
>
> The strength of the hock muscle exercises a considerable influence on the draft of a horse. When a horse is drawing a heavy load, a great strain is brought upon the muscles which straighten the hock joint so as to force the body forward, and the load after it, in walking; and it is a deficiency of ability at this point, oftener than at any other, which limits the power of the horse as a draft animal.
>
> To enable a horse to utilize his full weight to the best advantage, it is important that the attachment of the traces at the collar should be as low as the comfort of the animal and other conditions will permit. When the traces are low at the shoulder, there is less leverage for the draft to raise the horse off his front feet, and hence his weight counts for more. It will not do to lengthen the hame strap above and shorten that below so as to bring the attachment of the traces down upon the point of the shoulder, for then the heavy pressure of the collar will irritate the shoulder.

DEPARTMENT NEWS.

Sir Daniel Morris and Mr. J. R. Bovell arrived in New York on September 26, and after a short stay in that city, making inquiries as to the future of the markets for molasses from the West Indies, they proceeded to Washington to confer with the Secretary of Agriculture in the United States. Mr. Wilson offered every facility for carrying out an inquiry into the Sea Island cotton industry and arranged for a member of his staff to meet Sir Daniel Morris and Mr. Bovell at Charlestown and afford information respecting the experiments, now going on, to raise a variety of cotton immune to the wilt disease, while at the same time yielding fibre of high quality.

From October 6 to October 18, Sir Daniel Morris and Mr. Bovell were closely engaged in visiting the principal Sea Island cotton plantations in South Carolina and Georgia. They have gathered a large amount of valuable information and this will be made available to those interested in cotton growing in the West Indies as soon as possible.

The general impression gained is that the soil in many parts of the West Indies is richer than the soils where Sea Island cotton is cultivated in South Carolina and Georgia, and that the labour in St. Vincent, Barbados, Antigua and St. Kitt's is more reliable than in South Carolina and Georgia.

The Imperial Commissioner of Agriculture for the West Indies embarked at New York for Jamaica on October 24, and landed at Kingston on October 29. Sir Daniel Morris received a cordial welcome in that island and it has been arranged that his stay will be extended until November 17. During his visit to Jamaica, Sir Daniel Morris will attend three conferences of the leading planters and landowners in order to discuss (1) bananas, (2) the present position of the sugar industry, and (3) the cultivation of cotton. If quarantine regulations permit, it is possible that Sir Daniel Morris will land at Trinidad to arrange for the West Indian Agricultural Conference to be held at Port-of-Spain in January next. The Imperial Commissioner is due to arrive at Barbados on November 21.

Mr. J. R. Bovell, F.L.S., F.C.S., Agricultural Superintendent at Barbados, left New York on October 22 in the S.S. 'Korona' and arrived at Barbados on November 6.

Mr. G. Whitfield Smith, F.L.S., Travelling Superintendent on the staff of the Imperial Department of Agriculture, who proceeded to Canada on August 14, on three months' leave of absence, left New York in S.S. 'Parima' on October 30, *en route* for Barbados via the Northern Islands. Mr. Smith resumed the duties of his office at St. Kitt's on November 6 and returned to Barbados on November 13.

Mr. Henry Millen, Curator of the Botanic Station at Tobago, who proceeded to England on May, on three months' leave of absence, arrived at Barbados in the R.M.S. 'Orinoco' on October 28 and left for Tobago the same day in the R.M.S. 'Esk.' Mr. Millen resumed his duties on October 30.

The Secretary of State for the Colonies has accepted, with regret, the resignation of Mr. Murdo McNeill, Agricultural Instructor at Grenada. Mr. McNeill has found it necessary to resign his position on account of ill-health.

The following announcement, which was received too late for insertion, appeared as a supplement to the last issue of the *Agricultural News*:—

The Imperial Commissioner of Agriculture, while in Charlestown, South Carolina, made arrangements for seed of the best Sea Island cotton to be supplied to the Department for the next planting season. Planters and others desirous of obtaining this seed should apply to the officers of the Department in each island not later than November 25 next, stating how much they require. It is estimated that this seed will cost, delivered to the planters, about 7 cents per lb., and as it will have to be paid for when ordered, those requiring it should note that it must be paid for in advance. Should it cost more or less than the price mentioned, an adjustment will be made later. It may be mentioned that as there is a great demand for this seed, the holders are unable to give Sir Daniel Morris the refusal of it beyond the beginning of December; hence the necessity for requiring the orders to be sent in at once. It should be understood that the Department will be unable to procure a further supply of Sea Island cotton seed at any time between this and May next.

AGRICULTURAL SOCIETIES.

Barbados.

A special meeting of the Barbados Agricultural Society was held on Friday, October 6, for the purpose of hearing an address by Mr. A. F. Spawn, President of the Banana Food and Coffee Company, of New York.

Mr. Spawn, who is the inventor of a process for manufacturing 'coffee' from bananas, gave an interesting account of efforts that had been made by him to determine whether there was a market for his product. As a result of experiments at hotels, boarding houses and restaurants, he had come to the conclusion that, at a conservative estimate, one-fifth of the coffee drinkers of America would prefer banana 'coffee' to the real article.

With the present arrangements for shipping bananas from Barbados, there would be a large number of bunches ripening between the mails; such bunches and those too small for shipment could be utilized in the manufacture of banana 'coffee.' He was certain that he could find a market in the United States for the product of 21,000,000 bunches. His company would be prepared to put down a plant here which would take from 50 to 100 bunches a day, and the cost of such a plant would be about $2,000.

A committee, consisting of Messrs. S. Robinson, Sebert Evelyn and C. J. Greenidge, was appointed to confer with Mr. Spawn on his proposals and to report to the Society as to the advisability of taking steps to establish the industry.

GLEANINGS.

The appointment of Mr. A. W. Bartlett, B.A., B.Sc., F.L.S., Superintendent of the Botanic Gardens, as a member of the Board of Agriculture is gazetted. (Demerara *Argosy*, October 28.)

A shipment of 23 crates of bananas was made by the Imperial Department of Agriculture by the last mail, and it is expected that another shipment will be made to-morrow. (St. Vincent *Times*, November 5.)

An account is given in *Der Tropenpflanzer*, for October 1903, of a new gutta-percha plant from New Guinea. The author gives a description of the plant, which he names *Palaquium supfianum*, Schlechter. The gutta is said to be of medium quality, but probably it might be improved by more careful extraction, etc.

According to the British Honduras *Clarion* of October 22, there are signs of reviving prosperity in that colony. Among the hopeful signs may be mentioned an extension of the mahogany trade and the banana industry. The experiments in cotton planting are considered to be very satisfactory and it is hoped that a new industry will be successfully established.

The Grenada *Chronicle*, of October 17, publishes a letter from Mr. J. Russell Murray, of Montreal, Canada, on the Canadian trade in West Indian fruit. Mr. Murray writes: 'Yesterday we sold the first batch of Jamaica oranges for $3·62 per barrel and $2·11 per box. I think this should be encouraging to your people to make an early start.'

Questioned in Jamaica by a representative of the *Daily Telegraph* with reference to the position of Jamaica fruit in the United States, Sir Daniel Morris replied: 'I think that, on the whole, your oranges are now being put on the American market in better condition than formerly; and the New York people are inclined to take more favourably to them. But you must understand that I speak only of fruit that arrived in New York last week. The conditions might change at any moment.'

A cotton ginning apparatus will shortly be erected for the manufacture of the cotton crop now being grown at the Prison Farm in Jamaica. The old pumping engine, formerly used in connexion with the Spanish Town Water Works, is to be used for the purpose of supplying the motive power. The rice crop, which is now being grown at the Prison Farm, promises to be a very good one. A large section of the 4 acres in cultivation is showing rice in the ear. (Barbados *Advocate*, November 13.)

According to the Jamaica *Daily Telegraph* of October 31, British Honduras is growing cotton for the first time since the American Civil War. The British Cotton Growing Association has sent to the colony a quantity of seed, which has been planted. Nearly all the old sugar plantations are now growing cotton, and there is no doubt that it can be successfully grown there.

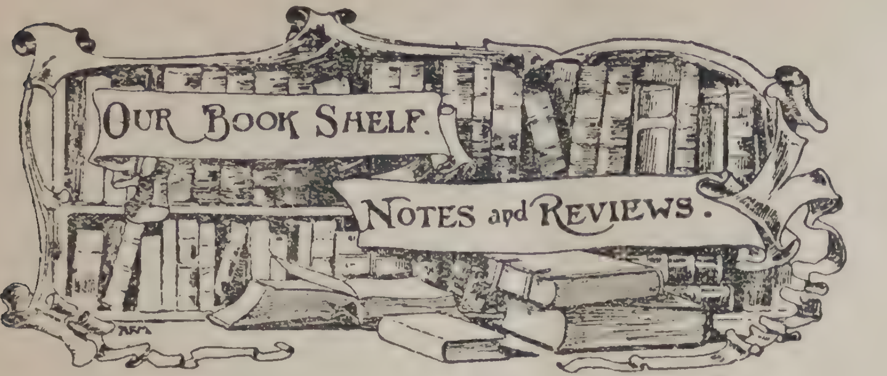
As is well known, the Peruvian cotton is of high quality. There exist in the Department of Piura and elsewhere on the coast of this republic vast tracts of land where it could be grown, but the want of the necessary capital for production on a large scale prevents this. The planting of Mit afifi cotton has been tried of late years and is giving very satisfactory results. (*Consular Report* on the trade of Peru for the year 1902.)

We understand that 2*d.* per head is being paid at the Police Stations for the destruction of that vile rodent, the mungoose, which, to our minds, is mainly responsible for the prevalence of so many destructive pests affecting injuriously the vegetation of the island, by reasons of its preying upon the birds which, before its advent and the unbalancing of nature, did their effective work, and obviated the necessity for applying Paris green or any other insecticide. In Barbados a larger sum per head is offered for its destruction. (Antigua *Standard*, October 31.)

The Jamaica *Gleaner*, of November 2, has an interesting article dealing with the increase in the consumption of cacao in the United States. In the last twenty years the imports of the raw product have increased sevenfold, amounting to 281,250 tons last year, over one-third of which went from the British West Indies. The writer states: 'The growing popularity of this article is a matter of special interest, because cacao is grown in the West India Islands, and while Porto Rico has not, so far, been a large producer of cacao, the large importations suggest that there may be possibilities in this line under the American flag.'

Speaking of cotton growing in the Leeward Islands at a meeting of the Agricultural Society held at Antigua on October 19, Sir Gerald Strickland said: 'Doubtless some historical prejudice existed against cotton growing, fortunes had been made and lost in it; but in former times growers were not in possession of the advantages offered to growers of the present day—they had possibly not secured the best kinds of seed; then they had no Imperial Department of Agriculture, no Paris green, no co-operative gins, no British Cotton Growing Association, no fast steamers and many other forms of assistance. A new cotton industry should now be founded on its own merits.'

According to our United States Consul at British Guiana, it is estimated that in British Guiana there are 74,000 acres under cultivation in sugar-cane, 12,000 acres in rice and 5,000 acres in other crops. Hand labour costs from 32 to 48 cents per day and the cultivation has heretofore been carried on chiefly by hand labour, without animal labour and agricultural machines. Recently, successful experiments have been made on some of the sugar estates in mechanical ploughing with the use of oil engines and wire cable from boats in the drainage canals on each side of the beds to be ploughed. If we recall our data correctly, steam ploughing with the Fowler steam ploughs operating in this way was in vogue in Demerara a quarter of a century ago. (*Louisiana Planter*, October 10.)


OUR BOOK SHELF.
NOTES and REVIEWS.

THE CHEMISTRY OF ESSENTIAL OILS AND ARTIFICIAL PERFUMES. By Ernest T. Parry, B.Sc. (Lond.), F.I.C., F.C.S. *London: Scott, Greenwood & Co., 1899.* Price 12*s.* 6*d.*

The industry of essential oils is already of some importance in the West Indies and it is probable that we have several valuable minor industries still in store based upon the production of medicinal and perfume oils. Mr. Parry is the leading chemical authority on essential oils in England, and he has presented in this book information of great value to all interested in his subject.

A book embodying in precise and detailed form the technicalities of any subject is always of value, and this volume is of peculiar interest and merit in that it gives full technical information upon a subject that has hitherto been almost a *terra incognita* to the average chemist.

The chemical composition, preparation and analysis of the essential oils are first given and this is followed by a systematic study of individual oils containing much information of general and commercial interest. The chemistry of artificial perfumes—the bugbear of all agricultural enterprise inessentials oils—is dealt with in a closing chapter, while a table in the appendix gives a tabulated summary of the 'constants' of all the chief products.

We welcome this volume as of value and interest to all who have interest in the industry with which it deals.

The above review was written by Mr. H. H. Cousins, M.A., F.C.S., Government Analytical and Agricultural Chemist, Jamaica, at the request of the Imperial Commissioner of Agriculture for the West Indies.

THE REPTILES OF BARBADOS.

(Concluded.)

The following notes on the Reptiles of Barbados by Colonel W. H. Feilden, which appeared in the *Zoologist* for August 1889, are continued from page 365 of this volume:—

Of the lizards found in Barbados, the Gecko, or 'Wood-slave, *Hemidactylus mabuia* Mor., has an almost world-wide distribution in the tropics, and its occurrence in Barbados may be easily accounted for, as it is known to be transported in ships. *Mabuia agilis*, local name, 'Scorpion,' is rather rare in Barbados; it chiefly affects damp and rushy situations. I procured it from Graeme Hall Swamp and Chancery Lane; it occurs over the greater part of tropical America, and its transport either by the agency of man, or by individuals, or eggs, on floating trees from the South American continent may be readily conceived. *Anolis alligator*, the pretty little common green lizard of Barbados, is special to the Lesser Antilles. Naturalists have subdivided it into almost as many species or varieties as the islands it inhabits; lately Mr. S. Garman, an American naturalist, has given the Barbados form the specific name of *Anolis extremus* (Bull. Essex Inst., vol. xix, 1887). It must be remembered that no animals appear to have a greater aptitude, when cut off from the parent stock, in assuming specific variations than lizards. The introduction of *Anolis alligator* into Barbados would probably be concurrent with the advent, from some other island of the Lesser Antilles, of the pre-historic men who first grounded their canoes on its shores, for this lizard may often be seen sunning itself on boats hauled up on the beach, and individuals often take an involuntary cruise in the fishing-boats. *Centropyx intermedius* Gray, the largest and handsomest lizard in Barbados, where it is known by the name of 'Guana,' probably a corruption of Iguana, and not, as I have heard in Barbados, from its having been introduced by the guano-laden ships, has likewise received specific rank at the hand of Mr. Garman as *Centropyx copii.* Whether the difference between the Barbados form and the South American race is sufficiently marked to entitle it to specific rank, I would not venture to determine, but Mr. G. A. Boulenger, who has examined the specimens I brought from Barbados, informs me that there is not the slightest difference between them and the typical specimens of *Centropyx intermedius* Gray. It is very remarkable, as I am likewise informed by Mr. Boulenger, that the large series of *Centropyx intermedius* in the British Museum from South America conists only of females, and the specimens I brought from Barbados are of the same sex. Apparently the male is undescribed, and I take this opportunity of suggesting to observers in Barbados that a series of males would be an acceptable donation to our National Institution. The species is quite common at Chancery Lane, though I was informed that the mungoose had taken to devouring it. Sir R. Schomburgk, in his 'History of Barbados' (p. 679), gives a list of ten species of lizards as occurring in Barbados; he enumerates this number of species, without giving any particulars.

The little tree-frog, *Hylodes martinicensis* Tschudi, is undoubtedly a very recent introduction; twenty years ago, as I am credibly informed, it was quite unknown. It is now spread over the entire island, and until the ear gets accustomed or deadened to it, the monotonous incessant chirping of this frog throughout the night, during rainy weather, is enough to drive a person distracted. This frog is found in Martinique, St. Kitt's, Saba, Dominica and Porto Rico, and doubtless in many others of the islands. Its transport to Barbados, along with plants, or by the direct agency of man, was to be expected.

There can be no question that the toad in Barbados, *Bufo marinus* L., vel *B. agua* Daud., is an importation of recent years. Schomburgk, writing in 1848, notes:—'I have been assured that this species, which is so common in Demerara, was introduced from thence about fifteen years ago. It has increased most rapidly, and is now to be met with in as large numbers as in Demerara.' There is certainly no falling off in the stock at the present time, as this toad is ubiquitous throughout the island. It is found in the islands of Grenada, St. Lucia, St. Kitt's, Martinique, Montserrat, Jamaica and Nevis, into all of which it has probably been introduced either by accident or on purpose, for it is said to be an exterminator of mice and to keep off rats.

I have already recorded in the *Zoologist* (1888, p. 236) the interesting fact of an alligator being transported alive on the trunk of a tree from the continent of South America to Barbados in 1886. I do not refer to the marine reptiles which frequent the shores of Barbados, because their visits do not possess the same zoo-geographical interest as the question of the introduction of the terrestial ones.

LECTURES TO PLANTERS AT BARBADOS.

It has been arranged for Mr. Lewton-Brain, the Mycologist and Lecturer in Agriculture on the staff of the Imperial Department of Agriculture, to give a course of three lectures to planters on the subject of diseases of the sugar-cane. The first lecture, which was introductory, was given in the Planters' Hall, Bridgetown, on Tuesday, November 17. The following is a summary of the lecture:—

The sugar-cane, like all ordinary green plants, consists of two parts—a root part, which grows down into the soil, and a shoot part, which grows up into the air. The shoot consists of a central axis, the stem, bearing leaves.

The sugar-cane possesses no main tap root, but it shows a large number of roots which arise from the base of the stem quite independent of one another. Root hairs are very delicate, tiny, white hairs, which grow out in large numbers from a point just behind the root tip. They are constantly dying away, and are replaced by others formed nearer the root tip as this forces its way into the soil. The stem is divided by a number of joints, the nodes, between which are the internodes. A leaf arises from each node, and in the angle between leaf and stem a bud is formed. From the nodes also arise the roots, several from each node; they are first covered by the bases of the leaves. Careful examination will show that they arise from the inner tissues of the stem and that they have to force their way out through the outer tissues. The leaf shows a well-marked leaf-base and blade. The base is large and forms a sheath to the stem. The large blade is lance-shaped, with parallel veins.

A transverse section across a mature root shows that it is divided into two parts. There is an outer part where the cells are thin-walled and loosely packed, and a central cylinder, where the cells are of two or three kinds, but generally appear smaller in section and more closely packed. Among these cells are to be noticed groups of larger thick-walled, apparently empty, cells. These groups are really strands which have been cut across, and are continuous with similar strands met with in the stem and leaves. These cells are wood vessels. They are like long tubes, their walls being thick and woody and variously marked.

If a section be cut near the root tip, it will be seen that the root hairs are outgrowths from some of the cells of the outermost layer. They grow out into the soil and become very closely attached to the soil particles; where they touch these the walls become gelatinous. At the tip of the root, we get the growing point. This is covered over by a cap of dead brown cells, the root cap, whose function is to protect the delicate growing region. The growing point is composed of cells which are all alike, closely packed, thin-walled, and full of living matter, protoplasm.

A transverse section of the stem also shows strands of wood vessels, but here these are scattered irregularly through the section; they are packed in by ordinary thin-walled cells. On the outside we get a special layer of cells, the epidermis. The outer walls of these cells are thickened so that they are impervious to water and resist the entrance of fungus hyphae. Just inside these are cells with thick elastic walls, whose function is to give mechanical support to the stem.

The leaf also possesses an epidermis like that of the stem. Here, however, we get openings between certain of the cells, the stomata; in the sugar-cane leaf the stomata are most abundant on the upper side; they are of great importance as they are the only means of communication between the plant tissues and the outer air. Between the upper and lower epidermis we have a mass of thin-walled cells with spaces between. These spaces open to the air by the stomata. The cells are characterized by possessing a number of small round bodies which contain a green colouring matter. Running through this tissue we have the strands of wood vessels, which are continuous with those of the stem, and so with those of the root.

The plant requires for its food, carbon, water and a number of mineral salts. The water and mineral salts are taken in from the soil. The root hairs are in intimate contact with the soil particles which are covered by a thin film of water, containing various salts in solution. This water diffuses through the thin walls of the root hairs, and is then passed on to the central strand, and into the wood vessels of the root. The current of water passes up these vessels, through the vessels of the stem to the vessels of the leaf, and is then distributed to the green cells of the leaf. The amount of water taken in is much greater than the plant requires as food, and the excess is evaporated through the stomata. When the air is very dry, or when a strong wind is blowing, and especially if the soil is dry, more water will be given off from the leaves than is taken up by the roots. Under these circumstances the sugar-cane leaf is able to roll up, forming a kind of hollow cylinder with the upper surface of the leaf lining it; this protects the upper surface from the wind and sun. The carbon needed by the plant is taken in from the carbon dioxide of the air: this passes in by the stomata and is absorbed by the green cells of the leaf. Here, under the influence of the sun-light the carbon dioxide is decomposed, the oxygen given off, and the carbon combined with water to form sugar. The formation of sugar is of great importance and only takes place under certain conditions—the presence of water and carbon dioxide, the presence of the green colouring matter and the presence of light. Part of this sugar is used by the plant for its growth, part is combined with other substances to form proteids, while the excess is passed down to the stem and is there stored up in the thin-walled cells.

The vegetative part of a fungus is composed of a network of threads, called hyphae, which branch and interweave to form a thick felt. The hyphae contain no green colouring matter. Fungi have various methods of reproduction. In one case a hypha will grow up into the air, its end swells up and becomes densely filled with protoplasm which also contains grains of reserve food. Next a cross wall is formed cutting off this swollen head from its stalk. Then the protoplasm of the head divides into a large number of little pieces, each of which rounds itself off, makes a wall and becomes a spore. These spores are formed in immense numbers; most of them are lost, but some few will come under favourable conditions and will then germinate. When this happens a small hypha is put out from one side of the spore, which grows and branches, forming the network from which we started.

In other cases the end of a hypha becomes, as before, densely filled with protoplasm. Then a small piece at the end is cut off by a cross wall and becomes a spore. Sometimes other pieces are subsequently cut off below this end and we get chains of spores. Sometimes these spore-bearing hyphae are single, but often they are massed together in special places, forming what may be called 'spore beds,' on which countless numbers of spores are produced.

The fungus possesses no green colouring matter. It is therefore unable to make for itself the starch or sugar that it requires for food, since their formation in a green plant is dependent upon the presence of this green colouring matter. Consequently, like an animal, the fungus needs its starch or sugar ready made, and it is this that has caused some fungi to become parasites on green plants.

MARKET REPORTS.

London,—October 27, 1903.—Messrs. Hales Caird & Co., Messrs. E. A. de Pass & Co., Messrs. Kearton, Piper & Co.; 'The West India Committee Circular,' October 26; 'The Liverpool Cotton Association Weekly Circular,' October 16; and 'The Public Ledger,' October 24, 1903.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 30/- per cwt.
Arrowroot—St. Vincent, 1¾*d.* to 3½*d.* per lb.; Bermuda, 1/3 to 1/8 per lb.
Balata—1/11½ to 2/5 per lb.
Bees'-wax—£7 10*s.* to £8 per cwt.
Cacao—Trinidad, 65/6 to 75/- per cwt.; Jamaica, 50/- to 62/- per cwt.; Grenada, 53/- to 64/- per cwt.; Dominica, 52/- to 62/- per cwt.; St. Lucia, 53/- to 62/- per cwt.; Demerara, 64/- to 65/- per cwt.
Cardamoms—Mysore, 8*d.* to 3/6 per lb.
Coffee—Jamaica, 32/- to 120/- per cwt.
Copra—Trinidad, £15 10*s.* to £15 12*s.* 6*d.* per ton, c.i.f.
Cotton—West Indian, 6*d.* to 6½*d.* per lb.
Fruit—
  Bananas—Jamaica, 7/- to 8/- per bunch.
  Grape Fruit—12/- to 13/- per case.
  Oranges—Jamaica, 9/- to 12/- per case.
  Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 36/- to 65/- per cwt.
Honey—Jamaica, 19/- to 28/- per cwt.
Isinglass—West Indian lump, 2/3 to 2/8; cake, 1/3 per lb.
Kola Nuts—4*d.* to 7*d.* per lb.
Lime Juice—Raw, 10*d.* to 1/3 per gallon; Concentrated, £13 to £13 10*s.* per pipe. Distilled Oil, 1/5; Hand pressed, 2/6 to 2/9 per lb.
Logwood—£4 2*s.* 6*d.* to £5. Roots, £4 to £4 10*s.* per ton.
Mace—2/- to 2/8 per lb.
Nitrate of Soda—Agricultural, £10 per ton.
Nutmegs—75's to 70's, 2/1 to 2/3; 90's to 80's, 1/7 to 1/11 per lb.
Pimento—3¾*d.* to 4¼*d.* per lb.
Rum—Demerara, 9*d.* to 11*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—Jamaica, no quotations.
Sugar—Crystallized, 15/1½ to 16/9 per cwt.; Muscovado, 11/- to 14/6; Molasses, 14/- to 15/- per cwt.
Sulphate of Ammonia—£12 7*s.* 6*d.* per ton.
Tamarinds—Antigua, 7/6 to 8/6 per cwt.

Halifax, N.S.,—October 20, 1903.—'The Maritime Merchant.'

Ginger—Jamaica, 24c. pure bulk.
Hay—$13·00 to $14·00 per ton.
Molasses,—Porto Rico, 43c. to 44c.; Barbados, 39c. to 40c.; Antigua, 33c. to 35c.; Trinidad, 44c. to 45c.
Nutmegs—50c. to 60c.
Pine-apples—$1·50 to $2·25 per dozen.
Potatos—40c. to 50c. per bushel.

St. John, N.B.,—October 20, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 41c. to 44c.; Barbados, 38c. to 39c. per gallon.

New York,—October 30, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.
Cacao—African, 12½c. to 13c.; Caracas, 14c. to 15c.; Jamaica, 10½c. to 12c½.; Grenada, 13c¼. to 13½c.; Trinidad, 13¾c. to 15c. per lb.
Cocoa-nuts—Trinidads, $16·00 to $18·00; Jamaicas, $20·00 to $22·00 per M.
Coffee—Jamaica, fair to good ordinary, 6c. to 7c. per lb.; Manchester grades, 7½c. to 10c. per lb.
Ginger—Jamaica, 7½c. to 8½c. per lb.
Goat Skins—Jamaicas, 50c. to 53½c. per lb.
Grape Fruit—$6·00 to $10·00 per barrel.
Onions—No quotations.
Oranges—$4·75 to $5·00 per barrel.
Pimento—7½c. to 8c. per lb., ex store.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3⅞c.; Muscovados, 89°, 3⅜c.; Molasses, 89°, 3⅛c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—November 7, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 to $3·75 per 100 lb.
Cacao—$11·50 to $12·00 per 100 lb.
Cocoa-nuts—$10·00 per M. (husked nuts).
Coffee—Jamaica, $7·50 to $8·50; ordinary Rio, $9·00 per 100 lb.
Hay—New Brunswick, $1·05 to $1·20 per 100 lb.
Manures—Nitrate of soda, $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00 per ton.
Molasses—No quotations.
Onions—Madeira, $4·00 per 100 lb.
Potatos, English—$3·00 to $3·50 per 160 lb.
Rice—Ballam, $4·75 to $5·00 per bag (190 lb.); Patna $3·60 to $3·75 per 100 lb.; Rangoon, $2·85 to $3·00 per 100 lb.
Sugar—No quotations.

British Guiana,—November 5, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8·75 to $9·00 per barrel.
Balata—40c. to 42c. per lb.
Cacao—Native, 11c. to 12c. per lb.
Cassava—$1·00 per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 10c. to 11c. per lb. (retail).
—Creole, 10c. to 11c. per lb.
Dhal—New, $3·50; Old, $3·35 per bag of 168 lb.
Eddoes—$1·08 per barrel.
Molasses—Vacuum Pan yellow, 15c. per gallon, casks included.
Onions—Madeira, 3½c. per lb. ex store. Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 3¾c.; American, 5c. per lb. (retail).
Plantains—20c. to 40c. per bunch.
Potatos, English—$4·00 per barrel.
Rice—Ballam, $4·60 per 177 lb., ex store; Patna and Seeta, $5·65 to $6·00 per 177 lb.
Sweet Potatos—Barbados, $1·08; Creole, $1·20 per barrel.
Tannias—$2·40 per bag.
Yams—White, $2·40 per bag.
Sugar—Dark Crystals, $1·97½ to $2·02½; Yellow, $2·20 to $2·40; White, $3·50; Molasses, $1·70 to $1·90 per 100 lb.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—November 4, 1903.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Venezuelan, no quotations.
Cacao—Ordinary, $13·75 to $14·00; Estates, $14·75 per fanega.
Cocoa-nuts—American, $16·00 per M.
Coffee—Venezuelan, 6½c. to 7c. per lb.
Copra—$2·50 to $2·75 per 100 lb.
Onions—$2·00 to $3·00 per 100 lb.
Potatos, English—$1·50 to $1·60 per 100 lb.
Rice—Yellow, $4·00 to $4·60; White Table, $5·40 to $5·80 per bag.
Sugar—Refined, $4·60 per 100 lb.

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[46.]

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Sugar Industry in Jamaica.

AN important and largely attended conference of sugar planters and others interested in the industry was held in Jamaica on November 12. The conference was presided over by his Excellency Sir Augustus Hemming, G.C.M.G., and addresses were given by Sir Daniel Morris, the Hon'ble William Fawcett, Mr. H. H. Cousins, and others.

In opening the conference, his Excellency said that he regarded the question they were about to discuss as the most important that could possibly be brought before any meeting of that kind in Jamaica. He still maintained the opinion that, whatever might be the value of other industries, the cultivation of sugar must be the staple industry of the colony, and although it had of recent years fallen upon troublous times he entertained great hopes that a revival of the industry might be possible.

In addressing the meeting, Sir Daniel Morris mentioned that since he had been in the West Indies he had taken an active part in endeavouring to improve the prospects of sugar growing in these islands. With regard to Jamaica, a mass of reliable imformation was collected by the Sugar Planters' Association and placed before the Royal Commission of 1897. From that it appeared that there were about 130 working sugar estates in the island; at the present time the number was about 120. It was stated that the average yield per acre in sugar was about 1 ton, but for each ton of sugar there were usually obtained 100 gallons of rum. There were practically no exports of molasses from Jamaica. The Commission was informed that the total cost of producing a ton of sugar and 100 gallons of rum was about £16 for both.

As a sugar-producing country, the opinion of two competent Agricultural Chemists (Messrs. Watts and Cousins) was that the soil was undoubtedly good and would grow canes as well as, if not better than, almost any other part of the West Indies. In fact Jamaica was extremely well placed by its natural facilities and circumstances for becoming a sugar-producing country. There were also special conditions favourable to the industry. Outside the banana districts, considerable areas were available for sugar growing with contiguous areas suitable for stock rearing and the raising of food-stuffs. It was very much in favour of Jamaica that there were practically no cane diseases, and it was possible to extend cane-farming in certain districts, as had been done so successfully in Trinidad.

As regards labour there might be a difference of opinion, but speaking generally he believed that labour in the sugar districts of Jamaica was not very far short of what might be counted upon as sufficient to carry on the industry, especially if labour-saving appliances were adopted. They also had the possibility of Coolie immigration. It might be said that this was expensive and often unsatisfactory, but still it was possible as a means of carrying on the industry; and he believed the Government would place no obstacle in the way of introducing more Coolies, if their presence were absolutely necessary.

In the matter of the possible improvement in the yield of canes, Sir Daniel remarked that Mr. Cousins was of opinion that the cultivation of improved seedling canes from Barbados and Demerara would justify a claim to at least 20 per cent. superiority over the canes now grown in Jamaica. He could not recommend seedling canes for any other locality than the one in which they had already been tried and found successful, and emphasized the fact that he did not advise the planter to take up the cultivation of seedling canes unless he were satisfied, beforehand, that the cane suited his own particular district.

The next point was the possibility of establishing central factories. Proposals had been put forward to start a factory in the Plantain Garden River district. It might also be possible to have a successful factory in the neighbourhood of the clay soils of St. Catherine, that were not suited for bananas; in Vere, and on some of the sea-side estates in St. James. A central factory, to be successful in any of those districts, must be run on a large scale, but they could not hope to obtain the characteristic Jamaica rum from them. If capital were available and the sugar industry placed on such a footing as to allow of the establishment of central factories, there was little doubt that they would be successful undertakings in certain districts of the island, and especially in those he had named.

In reference to markets for sugar, he might mention that during his recent visit to the United States he had been informed that the preference offered by Canada to the West Indies was not available under all circumstances. Previous to the abolition of European bounties, the preferential rebate offered by Canada to the West Indies was non-effective owing to the United States Government charging a countervailing duty equal to the amount of the bounty paid on European beet when exported. Now that bounties have been abolished and all sugars are on an equality in the United States and the United Kingdom markets, Jamaica will be unable to command a premium in New York. Therefore it was from now on that Canadian preference should show itself. The Canadian refiners would, of course, continue their efforts to secure West Indian sugar at the same price as the United States and the United Kingdom, and take the benefit to themselves of the preferential rebate. So that it rested with sellers in the West Indies to reach an agreement among themselves, whereby all shippers would refuse to sell to Canada, unless a premium were paid in proof of the preference offered to the West Indies. Otherwise the Canadian refiners would get their supplies at nearly £1 per ton cheaper than anybody else, thereby increasing their own protection at the expense of the West Indies.

The Hon'ble William Fawcett spoke highly of certain seedling canes and stated that when any new cane was heard of, it was at once sent for and propagated at the Hope Experiment Station for distribution to planters.

Mr. Cousins referred to the great possibilities for sugar growing in certain districts that were unsuited to banana cultivation. With the distribution of water in the Vere irrigation area and other localities, they would have magnificent stretches of land that could grow cane, perhaps, at a lower price than in any other island in the West Indies. If they could only maintain the old prestige of Jamaica rum there was a further security for the sugar industry on many estates in the island. A Fermentation Chemist had been engaged and they would endeavour to find out exactly how rum was produced and how the quality could be improved, and in some cases the quantity increased without injury to the quality.

In bringing the conference to a close, his Excellency said it seemed to him that the out-look was distinctly hopeful, and that being so, he could only express sincere hope that there would be a great revival of sugar growing in the island.

SUGAR INDUSTRY.

Distribution of Cane Plants at Barbados.

It is desirable that planters, who wish to obtain plants of Barbados seedling canes for planting, should make application for them between the present time and the end of February. Applications may be forwarded to Mr. J. R. Bovell, Superintendent of Agriculture at Barbados.

Sugar Industry in Fiji.

The following notes on the position of the sugar industry in Fiji are taken from the *Annual Report* on Fiji for 1902:—

The cultivation of sugar-cane forms the staple agricultural industry of the colony. Of the five sugar mills in the colony, three are owned by the Colonial Sugar Refining Company, Limited, of Sydney. A fourth mill has been erected by this Company at Lautoka, on the island of Vitilevu, which will commence crushing in 1903. The total area of land under cane cultivation in the colony is estimated at 27,279 acres, from which were produced 337,163 tons of cane.

Cane cultivation is also extensively carried on by time-expired Indian immigrants, who settle on small holdings in the vicinity of the sugar mills. In the Rewa district during 1902, they cultivated 1,206 acres, producing 24,881 tons of cane, valued at £14,925, and at Navua 2,356 acres were cultivated, producing 45,863 tons of cane, valued at £22,873.

Sugar Industry in Hawaii.

The following extracts, showing the wonderful increase in the amount of sugar exported from Hawaii, are taken from an article in the *Louisiana Planter* of November 14:—

The increase in the decade from 1873 to 1883 was about 44,500 tons; from 1883 to 1893, about 89,000 tons, and from 1893 to 1903 about 222,500 tons. The development of sugar production during the first decade was in bringing under cultivation lands capable of producing sugar without irrigation; during the second decade irrigation was applied in the least difficult sections; during the third decade the extension of irrigation and application of high-grade modern machinery to production greatly developed. The irrigation system now applied in Hawaii is of great importance and has brought under cultivation large areas which were absolutely valueless for sugar production without the application of water by artificial methods. More than one-half of the sugar of Hawaii is now produced from irrigated lands.

The Hawaiian Islands now stand third in the list of sections producing cane sugar for exportation. Curiously, all of the great cane sugar exporting spots of the world are islands. Cuba stands at the head of the list, with an annual exportation under normal conditions of over two billion pounds; Java next, with an average annual production of one and a half billion pounds, while the Hawaiian Islands have now nearly reached the one billion mark. China and India are also large producers of cane sugar, but consume practically all of their production, their exportation being small.

The Improvement of Barbados Molasses.

Arrangements were made for a special meeting of the members of the Commercial Body, the members of the Agricultural Society and all interested in the subject of Barbados molasses at the Commercial Hall, on Friday, December 4, for the purpose of hearing a paper by Sir Daniel Morris and Mr. J. R. Bovell embodying suggestions as to the best methods of handling molasses. The following is a brief summary of the paper:—

In Porto Rico there are three grades of molasses—(*a*) 'Fancy,' (*b*) 'Choice,' and (*c*) 'Prime.' Barbados molasses corresponds to the second grade, or 'Choice.'

All the molasses shipped from Porto Rico is graded by the merchants, after it is bought from the planters. It is shipped in hogsheads containing about 150 gallons, in puncheons of about 110 to 120 gallons each, and in barrels of about 50 to 55 gallons. The hogsheads and puncheons are made of the best new packs and are bound round with strong, locked, wooden hoops. In Barbados the ends of the wooden hoops are bound with rope yarn, which is objected to by the buyers as not being sufficiently strong.

Barbados molasses used to keep as well as that from Porto Rico, but lately some of it has been acid. Good molasses should be light-red in colour, non-fermenting and have baking qualities.

As to loss of molasses on shipment, it was stated that the loss on Porto Rico molasses was 1½ per cent., while that on Barbados was frequently from 5 to 10 per cent.

The value of a gallon of Porto Rico 'Fancy' molasses this year in New York was about 35 cents per gallon, while Barbados molasses was worth about 28 cents.

Nearly all the Porto Rico 'Fancy' molasses is used in the eastern part of the United States; while Porto Rico 'Choice' and Barbados nearly all go to Canada.

Although the price might fall slightly if the planters of Barbados made all their crop into 'Fancy' molasses, yet molasses is becoming scarcer every year owing to the erection of central factories in Porto Rico and Cuba. The price this year was exceptional; but probably a good price would be obtained next year, as the molasses crop of Louisiana was short. The price would, however, depend in a great measure upon the corn crop, since glucose is principally made from corn.

The following recommendations are made:—

(1) Barbados planters should during the coming season prepare for shipment a number of barrels of syrup similar to that sent from Rugby estate last season.

(2) On estates where vacuum pans are in use, an excellent table syrup might be produced by decolourizing the cane juice with sulphur fumes, then adding lime nearly to neutrality, evaporating the juice in the tayches to thin syrup, adding, if necessary, some citric acid, settling the syrup to allow the impurities to subside and afterwards concentrating in the vacuum pan.

(3) All syrups should be put up in barrels in which sulphur has previously been burned, according to the method adopted by Dr. Wiley, Chief of the Bureau of Chemistry, United States Department of Agriculture, who stated that a barrel of syrup thus treated had kept quite good for months, in spite of the fact that it had been opened several times for samples to be withdrawn.

WEST INDIAN FRUIT.

BUDDING MANGO TREES.

The following notes on the budding of mangos are taken from an article by Mr. T. J. Harris, Agricultural Instructor, in the *Bulletin of the Department of Agriculture, Jamaica*, for November:—

With a view to turning to profitable account the enormous amount of plant energy that is more or less wasted in Jamaica annually in the production of mangos of inferior quality, experiments in budding have for some time been conducted at the Hope Experiment Station which have at last resulted in success.

The first work to be undertaken is to bud over the large common mango trees that are already growing, though the laying out of orchards with seedling stocks might be started at the same time; these latter would take some six to eight years after budding to bear, whilst the old stumps would quickly replace their tops with the wood from the bud and bear a fairly large crop in two or three years. The trees should be cut down carefully—with a cross-cut saw to prevent bruising and splitting of the stump—to within 2 feet of the ground, the cut pared smooth with a knife or plane, and tarred; a number of shoots will very quickly spring from the stump and these must be thinned out to three for budding upon, taking care to get them as near the top as possible; as soon as they are $\frac{3}{4}$ inch in diameter at the base, they will be ready for budding.

The operation of budding is merely transferring a piece of bark, containing a bud, from the desirable tree to a place on the stock from which a corresponding piece of bark has been removed, but to ensure success the following essentials must be observed:—

That both the stock and the tree yielding the buds be growing rapidly.

That the bud-wood be a little larger in diameter than the stock, to ensure the area on the under side of the actual bud being brought into close contact with the wood when tied in; if the bud-wood be less in diameter than the stock, a hollow space will occur between these parts.

That the bud be tied in tightly, especially at the points just below and above the bud proper, but yet not tight enough to crush or bruise the bark.

That the piece of bark containing the bud be removed from the wood without bruising, bearing in mind that bending will bruise or crush the cells of a plant.

That the moisture be retained in the bud, during the time required to join up, by using tying material that will prevent evaporation, *i.e.*, waxed tape. This is made by dipping $\frac{3}{8}$ inch tape into a melted mixture of 1 lb. bees'-wax, a piece of resin the size of a hen's egg, and half a wine-glass of raw linseed oil, scraping off the superfluous wax with a dull knife after cooling.

The bud-wood should be near the stock to ensure no time being lost between the taking off of the bud and its insertion in the stock.

CLOVER IN ORANGE GROVES.

The following extract from a letter addressed by Mr. Walter Draper, Government Gardens, Delta Barrage, Egypt, to the Imperial Commissioner of Agriculture for the West Indies, dated October 3, 1903, may be of interest to orange-growers in certain localities, as indicating a means of raising a profitable fodder crop while, at the same time, renovating the soil:—

I am to-day sending to you a sample box of Egyptian clover (Bersim) and one of Egyptian beans (Foul).

The clover is an excellent fodder crop for the renovation of poor soil, giving six cuttings. The last can be left for seed. This latter crop when cut is threshed and the chaff used for packing, feeding cattle or brick making.

The Egyptian clover or 'Bersim' cut and dried (if land is wanted earlier) is known here as 'Derice.' It is largely used in Egypt as a summer fodder.

The Egyptian bean (Foul) sown here in December is a four-months' crop, yielding an average of 8 ardebs to the feddan (acre). The crop is sold in Egypt at 18*s.* to £1 per ardeb. Prices to-day 19*s.* 6*d.* per ardeb.

Our orange crop has this summer had a bad attack of black scale. The trees have been pruned back; stems and branches painted with a mixture of lime, soot and petroleum; and the soil between trees ploughed and a crop of clover sown. They have broken into leaf nicely and appear healthy, but as it is difficult to prune all trees, I fear the attack again next summer. For any information on treatment of scale I shall be most grateful.

Lime Flower on Spine. Mr. J. H. Hart, Superintendent of the Botanic Gardens, Trinidad, has forwarded a botanical curiosity in the form of a flower developed on the spine of the lime plant (*Citrus medica* var. *acida*). Mr. Hart informs us that this occurred on the growth made after budding on a Seville orange stock. On the specimen sent there are a large number of spines, but only one has a flower, and that one is nearly twice the normal length.

COTTON.

Cotton in St. Vincent.

The following extract is taken from the St. Vincent *Times*. It will be seen that the prospects of building up a successful cotton industry in that island are encouraging :—

We are glad to say that after careful inquiry we find that the cotton in this island is quite free of any disease or the attacks of any insect pests except the red and black bug, which has always been more or less in evidence. It would appear, however, that our neighbours are not as exempt as we are, and their cotton is suffering in various ways, and especially from the devastation of a caterpillar which destroys the foliage and ultimately the plants. We therefore trust we shall continue in our present free condition, and as we can readily combat the red bug by placing small heaps of cotton seed amongst the growing plants and destroying the insects which collect upon them, we hope our cotton cultivation will be a complete success.

The cotton seed used as above need not be fresh, and may be such as is useless for planting or sowing, but it should have a portion of the fibre attached. This simple remedy will not get rid of the pests entirely, but will be found a means of keeping them within bounds.

Everything necessary for the erection of the cotton factory, as well as the engine and ginning machinery, has been ordered and is on hand. The authorities are awaiting the arrival of Sir Daniel Morris [on December 16 next] before the actual building operations are commenced. This need cause no uneasiness as it is very unlikely that any cotton will be ready for ginning before February, and the factory can easily be completed before that time. The building when finished will be an addition to the appearance of our town besides giving employment to some of our respectable labourers. It will be of three storeys—the ground floor being reserved for the engine and baling presses and the next floor for the ginning apparatus, with store-room for the raw cotton above. Altogether it will be a rather imposing structure, and, as we understand, will be built with an eye to appearance as well as utility.

Cotton Cultivation in Cuba.

The following article on the cultivation of cotton in Cuba is taken from the *Board of Trade Journal*, October 29, 1903 :—

Referring to the article published on p. 208 of the *Board of Trade Journal* for October 30, 1902, a report on 'Commercial Cuba,' published by the United States Department of Commerce and Labour, deals with the proposed cultivation of Sea Island cotton in that island, and in this connexion the opinion of an American cotton expert has been obtained.

It is considered that the farm lands in Pinar del Rio, which apparently consist as yet to a large extent of recently cleared virgin soil of great fertility, are well suited to the purpose, timber and fuel sufficient for many years' supply being at hand. Cotton has been found growing wild in the woods, the trees appearing to range from one to five years in age. On cultivated farms Sea Island cotton has been planted from seed imported from Florida from fifteen days to four months old, and in every case the plants appeared healthy.

The crop from a twelve-month-old tree is estimated at 500 mature bolls per tree for the first year, and it is anticipated that every crop would be better until after the third or fourth year. This would give a result of 4℔. of seed-cotton to the stalk in a year's growth, or about 3,000 ℔. of seed-cotton to the acre, which would net at least two 500 ℔. bales of lint-cotton per acre. The staple is stated to be strong, fine and silky, and longer than the average Sea Island cotton in the United States. Its strength would probably increase with the employment of a high-grade fertilizer.

In conclusion, the American expert says: 'In a word, I consider conditions in Cuba from every standpoint more favourable to the successful cultivation of cotton than conditions in the cotton belt of the United States, and that with proper preparation of the soil, careful selection of the seed, and frequent cultivation, the Sea Island cotton grown in Cuba will be far superior to our best varieties. The native wild cotton resembles the Egyptian variety in texture, and has a clean, black seed, with a staple somewhat longer than our best Uplands, but I would recommend the exclusive growing of Sea Island cotton on your plantations, as the conditions of the soil there appear to me favourable to the successful raising of the choicest variety of long-staple cotton.

BACTERIOLOGY AND AGRICULTURE.

The following report of a lecture recently delivered at Oxford by Professor R. Warringnon on 'The Assimilation of Atmospheric Nitrogen by the Agency of Soil Bacteria' is taken from the *Agricultural World* of September 5 :—

Nitrogen had long been known to exist in plants, but until quite recently the original source of it was but very imperfectly understood. It was known that a certain amount was supplied in the shape of manure to the growing crops, but careful experiment sshowed that, in some cases, more nitrogen was contained in the mature plant than could have been obtained from the manure and soil together. Particularly was this noticeable with leguminous crops, such as clover, beans, peas, etc. Moreover, it was also found that besides containing more nitrogen in themselves, leguminous plants actually left more in the soil than was there at first, whilst cereals reduced the quantity and exhausted the land, thus necessitating the 'rotation of crops,' so well known in practice to every farmer. Whence, then, came the extra amount of nitrogen? An obvious theory was that it might come from the atmosphere, but investigations, made by Boussingault, Lawes, Gilbert, and Pugh, appeared to show that the plants had no power of directly assimilating free atmospheric nitrogen. A characteristic feature of all leguminous plants was the nodules, or small rounded lumps, which were attached to their roots; and it was demonstrated by Hellriegel and Wilfrath that when the plant was grown in sterilized sand, the nodules did not appear and the plant did not develop. If, however, a very minute quantity of ordinary fertile soil were added, the nodules immediately formed, the plant grew vigorously, and subsequent analyses showed that it contained far more nitrogen than was furnished by the seed and the soil. Schloesing and Laurent, experimenting with plants growing in fertile soil, proved that leguminous plants did actually consume atmospheric nitrogen; and on studying the nature of the nodules, Woronin, Marshall Ward, and others found that they contained a certain bacillus which, when associated with the plant, was capable of assimilating nitrogen from the air, and ultimately supplying it to the plant in the form of proteids. Attempts had thereupon been made to provide cultures of these bacteria on a commercial scale under the name of 'Nitragin,' but in practice their use had been found to be wholly superfluous, and the manufacture had been discontinued.

SCIENCE NOTES.

Sources of Sugar.

Dr. C. A. Kern recently wrote in the *American Grocer* on the distribution of sugar in the vegetable kingdom, his paper being reprinted in *Indian Planting and Gardening* of July 18.

After referring to the formation of sugar in the leaves of green plants, Dr. Kern states the percentage of sugar in several well-known fruits:—

Cane sugar and glucose always appear together in plants and the relative proportion varies according to the presence of different organic acids, the cane sugar of very sour fruits being inverted by these acids. The quantities of sugars found in various fruits are as follows:—

	Cane sugar. Per cent.	Glucose. Per cent.
Pine-apple	11·33	1·98
Strawberry	6·33	4 98
Apricot	6·04	2·74
Banana, ripe	5·00	10·00
Apple	1—5·40	7—13·00

Sugar is also found in nuts and almonds, figs, melons, chestnuts, clover leaves, onions, oranges, peanuts, timothy grass, etc., but not in sufficient quantities for manufacture. The scope of this article is only to consider such plants which were and are used in the production of sugar, and the above list was given merely to illustrate the large amounts of sugar found in ordinary food products. It is a well-known fact that honey was the sweetening medium before sugar was known, and in this instance the sugar came indirectly from the flowers of plants.

The oldest sweetening material is undoubtedly the so-called 'palm sugar' from India. This is called 'Jaggery' or 'sharkari,' and is made from the juice of palms, such as *Phœnix sylvestris*, cocoa-nut palms, *Arenga saccharifera*, etc. The sugar palms are planted in rows in dry, fertile land and produce from the 5th. to the 30th. year. The gathering of the juices commences in November and ends in February. A triangular slit, 1 inch deep and 6 inches long, is made under the lowest branches, and a hollow bamboo cane is fastened to the lowest corner of the silt. On the other end of the bamboo is an earthenware pot. The next morning before sunrise this pot contains a thin, very sweet solution of cane sugar. After drawing the juice for three days, the tree must have a rest. One tree can produce from 35 to 40 ℔. of sugar in one year. This juice is now boiled down in earthenware pans, sometimes lined with a little lime, and then it is poured into flat dishes made of palm leaves, in which it is dried in the sun. The total annual production amounts to 50,000 tons.

In the temperate climates of North America the maple is the sugar-producing tree. The time of gathering is in the early spring, after the snow has gone and when the leaves are sprouting. This period lasts over five or six weeks. Holes 2 or 3 inches deep are bored into the trunk and one end of a pipe is fitted into these holes, the other end running to a vessel. The juice runs freely for several hours, and then after some hours of rest again runs freely. After cold nights and sunny days the trees give off the greatest quantities, as high as 12 quarts. The juice is evaporated and, after skimming down, is poured into square moulds. The manufacture of maple sugar was first carried out by the Indians, especially the Delawares.

Before the arrival of the Spaniards in Mexico and Peru, the natives made sugar-juice and also sugar from corn (*Zea Mays*). The sweet corn plant was pressed and the juice concentrated and cooled. The best sweet corn contains as much as 10 or 12 per cent. of sugar.

Sorghum (*Sorghum saccharatum*) comes from Central Africa and was known to the old Romans as a sugar-producing plant. In China sorghum has been cultivated since olden times. There the juice is used directly, or is fermented into a beverage. Most of these processes are now historical and there are only two plants which are the sources of our enormous sugar production—namely, cane and beet.

Of these two, cane is the older and possibly originated in India on the river Indus. It was first mentioned in a report of Nearchos, Admiral of Alexander the Great, in which he stated that the natives produce honey and a white sweet substance from a reed cane.

The sugar beet (*Beta Cicla*) grows wild on the shores of the Mediterranean and Caspian seas, in Mesopotamia and East India. From these places the sugar beet spread all over Europe. In 1747 the German chemist Marggraf discovered and produced the first sugar from beets, as is stated in a report made to the Berlin Academy of Science. In 1786 Achard, a scholar of Marggraf, raised sugar beets especially for the manufacture of sugar and built the first beet sugar factory, the first output of which amounted to 1,600 ℔. of raw sugar.

The Sour Sop.

The Sour Sop (*Anona muricata*) is a small tree belonging to the family *Anonaceae*. It grows wild in many parts of the West Indies, where its well-known fruit is much appreciated on account of its pleasant sub-acid flavour. The tree bears a large green fruit with rough, prickly skin which sometimes weighs over 2 ℔. It has a soft, juicy, white pulp in which large black or brown seeds are embedded.

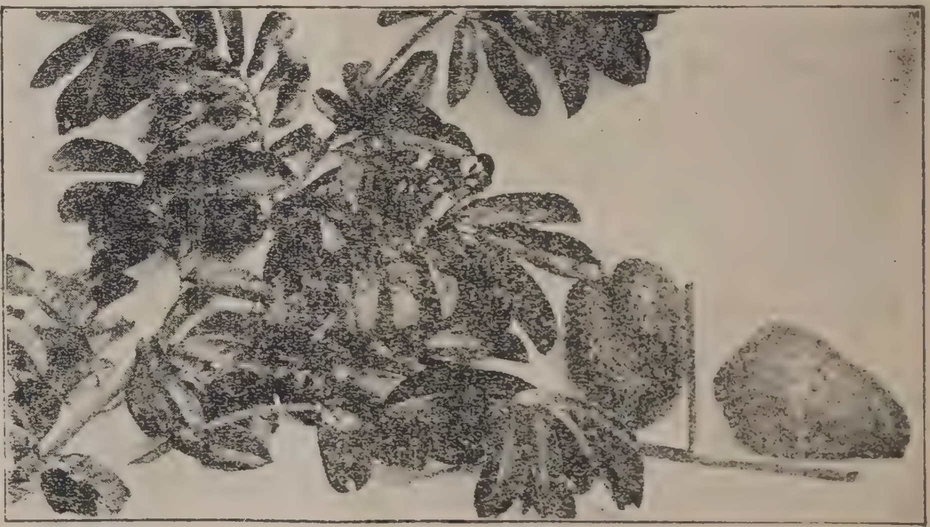

Fig. 34. Fruits and Leaves of the Sour Sop.

[From the *Annual Report of the Porto Rico Agricultural Experiment Station for 1902.*]

In Jamaica a kind of arrowroot, known locally as 'pap,' is made from the unripe fruit.

An infusion of leaves is said to be used medicinally as a remedy for dysentery.

The genus *Anona* contains several other fruit trees, viz., the Sweet Sop or Sugar Apple (*A. squamosa*), the Custard Apple (*A. reticulata*) and the Cherimoya (*A. Cherimolia*); while the cork wood tree (*A. palustris*) yields a very light, soft, fibrous wood, which is used for making floats, razor strops, etc.

MULE-BREEDING.

The following article on 'Profit in mule breeding,' which originally appeared in the *American Agriculturist*, is taken from the *Queensland Agricultural Journal* for October. It would appear that the information contained in this article should be of interest to West Indian stock breeders. The writer makes mention of the special uses to which mules may be put and draws attention to their many advantages. Mule-breeding is practised to a considerable extent in the West Indies, notably in Jamaica:—

To begin with, mules can be raised cheaper than almost any other farm stock. Especially is this true when compared to horses. They can be given light work when two years old, and if properly handled, will often at this age do as much as a four-year-old horse colt. Of course, under no circumstances should the work be heavy, or the growth of the animal will be checked. If used for driving, for pulling a light cultivator, or for hauling moderate loads, the animal is better off than if allowed to remain idle. The growth is not checked, but the muscles are hardened and developed, so that at four or five years old a perfect work animal results. With this kind of training they will go into market much earlier than horses, and consequently, the investor gets a quicker return on his money.

The mule stands heat much better than the horse. In the north this is not so important as in the south, but during harvesting time the man who has two or three good teams of mules, is far ahead of his neighbour who has none. They can stand more abuse and greater hardships than horses, but respond to kind treatment by being very gentle and teachable. They are less liable to diseases, and are not so apt to become blemished as colts. If a lot of them are in pasture during the season, fewer of them will show blemish than the same number of colts under like treatment. Another important item is the fact that mules instinctively avoid rough and dangerous places. They are much more careful to secure a good footing, when on a rough road or crossing a dilapidated bridge. It seems that the mules' nerves are stronger, and they do not lose their heads when they get into a close place.

For all kinds of farm work they are especially steady and always ready. In planting corn or opening a furrow through a field, it is very much easier to drive straight with a good mule team than with horses. In ploughing corn, they use much more judgement in keeping off the hills. Their hoofs are usually very tough, and it is seldom necessary to have a mule team shod on the ordinary farm, unless they are to be used a great deal during winter weather, when roads are frozen or icy. Keep the hoofs carefully trained, and if the animal has never been shod there is seldom a call for shoes.

Mules can be placed on the market any time after weaning. In mule-raising regions, they are considered saleable property after ten months old By pasturing and feeding until they are two and a half and three years old, they are ready for market. They eat a small amount of feed ; and while they, of course, prefer good hay and grain, they will eat almost any kind of rough feed. In this way it is possible to raise them cheaper than horses.

In a discussion at a recent Illinois live stock meeting, it was brought out that for the average farmer mule-raising is more certain and profitable than trying to raise horses. This is probably true from the fact that people who are not experts in animal husbandry can succeed very well in raising mules.

HYBRIDIZATION.

The following account of an address delivered before the South Mysore Planters' Association by Mr. C. A. Barber, M.A., F.L.S., Government Botanist, Madras, formerly Superintendent of Agriculture at Antigua, on the subject of hybridization experiments, is taken from *Indian Planting and Gardening* of October 10:—

Reference having been made to the experiments in hybridizing coffee, I would like to say a few words, since there seems to be some misconception regarding the laws regulating their characters. Planters seem to think that when they have obtained a hybrid their work is done, and if it proves a failure, as it is certain to do, they disgustedly drop the thing. Really they have only taken the first step in a long and arduous business.

I can explain with a reference to the sugar-cane seedlings in Barbados. There, of the 3,000 seedlings raised every year, only one or two are finally considered worthy of extended trials. The vast bulk are regularly and ruthlessly destroyed. The obtaining of coffee seedlings is a much easier thing, but it is necessary that the great majority should be similarly destroyed.

The reason for this is perhaps the following: It is a rule with hybrids that there is very marked tendency in their offspring to vary. Even when two parents with definite characters have been carefully chosen (almost an impossibility with sugar-cane) the offspring vary enormously, there being, among other characters, a very strong tendency to throw back to an ancestral type. Now in cultivated plants the ancestral type is a 'wild' one, and therefore it is reasonable to expect what really frequently happens, that the offspring are, to a great extent, quite unfit for cultivation.

The first step with hybrids then is rigorously to thin out all that do not appear well worth going on with. The ones so selected will presumably have certain characters such as it is desired to fix; vigour, freedom from disease, character of bean, and so on. Those that are chosen to go on with should be crossed among themselves or even 'bred in and in', that is, prevented from crossing with any other plants. The useful characters are by this means intensified. When once a useful type is obtained it must be 'fixed' and the 'in and in breeding' is intensified. It takes comparatively few generations to fix the type, but meanwhile it is important to keep the plants carefully protected from the pollen of neighbouring plants.

It is therefore a pity that the many hybrids and their offspring, which we see scattered over coffee estates at present, should be considered the final product, when they merely represent the first and chiefly useless results.

For the experiments to succeed it is essential that they should be conducted on a large scale, and that the experiments should be conducted continuously with a very definite object in view. Once this object is defined, the result is usually only a matter of time. It is possible within fairly large limits to obtain almost any result, and this is for the very reason that there is such an enormous variation at the start that almost any tendency can be spotted and fixed. The work is long and tedious and cannot be done by any one planter. But by the help of all and a suitable combination of energy there is no reason why equally good results may not be obtained with coffee as with the many other plants, such as potatos, sugar-cane, beet-root, etc., which have been improved so immensely in this way.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 351 of this volume.

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Agricultural News

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NOTES AND COMMENTS.

Cotton in the West Indies.

The following is an extract from a letter addressed by the Secretary of State to the Imperial Commissioner of Agriculture for the West Indies, dated Downing Street, November 7, 1903.

'The British Cotton Growing Association has kindly offered to handle all cotton shipped to Liverpool from West Indian Colonies free of charge with the exception of brokerage.'

Para Rubber Seed.

An interesting letter appears in the September issue of the *Agricultural Bulletin of the Straits and Federated Malay States* from Mr. Francis J. Holloway, the writer of the paper on 'Preparing Para rubber in Ceylon,' published in the *Agricultural News*, Vol. II, p. 265.

In this letter Mr. Holloway mentions that the question has been raised whether the tapping of a Para rubber tree causes the seed to be of less value for planting, and some planters in ordering seed stipulate that it should be from untapped trees.

Mr. Holloway has carefully tested the matter with seeds from both tapped and untapped trees, and his experience leads him to conclude that there is not the slightest difference in trees grown side by side for the past four years.

Mr. Willis, the Director of the Royal Botanic Gardens, Ceylon, to whom the matter was referred, states that fewer seeds are obtained from tapped trees but that they appear to be in no way inferior to those from untapped trees.

The editor of the *Tropical Agriculturist* suggests that the wisest course would certainly be to set apart certain rubber trees for seed-producing purposes as is done with tea plants.

Kola Nuts.

In a paper published in the *West Indian Bulletin*, Vol. IV, p. 182, it was stated that a difference existed in Kola nuts found in West Africa, and that the most valuable nuts are claimed to be those with two cotyledons only.

The nuts of *Cola vera* have only two cotyledons and are more highly valued, on account of the greater proportion of caffeine and theobromine they contain, than those of *C. acuminata* with four cotyledons.

It was also mentioned in the paper referred to that kola seeds were being obtained from Sierra Leone by the Director of the Royal Gardens, Kew, with a view to introducing a more valuable kind of kola than is at present cultivated in the West Indies. A box of seeds of *C. vera*, from Sierra Leone, was recently received from Kew, and these have been distributed to the Botanic Stations throughout the West Indies, the Curators being asked to furnish later a report on the experiment.

Agriculture in Senegal.

The *Consular Report* on the trade of Senegal gives an interesting account of the position of the chief agricultural industries in the colony. It is stated that this important, though long-neglected, enterprise is now receiving the serious attention of the government, and efforts are being made for its organization and encouragement. The soil, which has hitherto had very little attention bestowed upon it, is fertile and productive. The efforts which have been made to introduce agricultural implements, appear to have been appreciated. The reports from most of the districts are eminently satisfactory; in some of the districts the yields of ground nuts are double those of the previous year, while millet and maize have given large crops.

The chief crops of the colony are ground nuts, maize, rice, gum, rubber, cotton and kola.

It is considered that the ground nut industry admits of even greater development, since the methods of cultivation in most districts might be considerably improved and larger areas devoted to this crop. An account of the culture of the ground nut in Senegal will be found in the *Agricultural News*, Vol. II, p. 297.

A large trade is done in rubber, the exports in 1902 being valued at £90,836. Numerous plants are cultivated for rubber, *Landolphia tomentosa* and *L. Vogelii* giving the best results. In view of the steady decline in the output, the local merchants are urging upon the authorities the necessity of State aid.

The principal agricultural exports of the Ivory Coast, a dependency of Senegal, are palm oil and kernels, mahogany, coffee and rubber. Palm oil is supplied chiefly to France, and the other exports are mostly taken to the United Kingdom.

Cassava Starch in the American Market.

In view of the attempts that are being made to start a cassava starch industry in the West Indies, the matter of the position of that article on the American tariff is of considerable importance. Some time ago a letter was published in the Jamaica *Daily Telegraph* in which it was stated that cassava starch was allowed to enter American ports free of duty. In order to remove all doubt in the matter, the same paper publishes the following letter addressed by the Collector of Taxes for the Port of New York to Messrs. B. Remmers and Son, of Philadelphia:—

'In reply to your inquiry of October 2, 1903, I have to state that the Appraiser at this port informs me that it is the practice to allow "tapioca flour and cassava flour (also called cassava starch)" under the provisions of paragraph 677 of the Free List, and "sago" or "sago flour" is returned by the Appraiser under the provisions of paragraph 652 of the Free List Act of July 24, 1897.'

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Agaves.

In the *Yearbook* of the United States Department of Agriculture for 1902, there appeared a paper by Mr. E. W. Nelson on 'The Agaves, a remarkable group of useful plants.'

The plants forming this group were found in Mexico by Cortez and his followers; next to maize and potatos, they were considered by Humboldt, the most useful of the natural products of tropical America. It is estimated that there are about 150 species now known in the genus *Agave*; they are most commonly found in the limestone areas where the rock has but a thin covering of soil.

All agaves require years for their development before flowering, and this has given rise to the popular name 'Century plant,' borne by *Agave americana*, which may be taken as a typical member of the genus.

The most important product is 'Pulque,' the national drink of the Mexicans, which is made from the sap of *Agave americana* especially. The sap flows for some time after the inner leaves are cut, just before the flower scape is ready to burst forth. The value of the total product of pulque amounts to millions of dollars annually.

The agaves also have their uses as food plants. The fleshy bases of numerous species are roasted and eaten by Indians and others. It is stated that, as a result of the slow roasting, the fleshy substance becomes sweet and tender.

In addition to many other uses, such as supplying soap, tough paper, etc., the agaves are an important source of fibre. The best known of the fibre agaves is the sisal hemp (*Agave sisalana*). The success of the cultivation of the sisal in Yucatan has led to its introduction into the Bahamas and some of the West Indian Islands. An account of the cultivation of this plant in Hawaii will be found in the *Agricultural News* (Vol. II, p. 313).

Recent Department Publications.

Among the publications issued in time for distribution by this mail, the following may be mentioned:—The *West Indian Bulletin*, Vol. IV, No. 3; the *Annual Report on Sugar-cane Experiments in the Leeward Islands, 1902-3*, Part I, and *Seedling and Other Canes in the Leeward Islands, 1902-3* (Pamphlet Series, No. 27).

Notices of these publications, which can be obtained of all agents of the Department, will be found on p. 395 of this issue.

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The 'West Indian Bulletin.'

The third part of Volume IV of the *West Indian Bulletin* is issued to-day. This number is devoted entirely to cotton: a large amount of valuable information has been gathered together from various sources, which should be of great interest to cotton growers in these islands.

The papers contained in this issue are—'Cotton Cultivation in the United States,' 'The Origin and Distribution of Sea Island Cotton,' 'Varieties of Sea Island Cotton,' 'The Improvement of Sea Island Cotton by Seed Selection,' 'Cultivation of Sea Island Cotton,' 'Cotton Cultivation in the West Indies,' 'The Agricultural Chemistry of Cotton,' 'Fungoid Diseases of Cotton' and 'Insect Pests of Cotton.'

It will thus be seen that the Imperial Department of Agriculture is endeavouring to place before planters in the West Indies information on all matters connected with cotton growing. Much of this information has been gathered by the Experiment Station workers and others in the United States and will serve to indicate the amount of labour expended on the improvement of the cotton industry in that country.

Under the title of 'Cotton Cultivation in the West Indies,' are brought together particulars, furnished by officers of the Department and planters, of the first efforts to cultivate cotton at St. Kitt's, Antigua, Montserrat and Barbados.

In the article on 'The Agricultural Chemistry of Cotton,' compiled by Professor J. P. d'Albuquerque, interesting information will be found as to the composition and uses of the various portions of the cotton plant. An account is given of the manufacture of cotton seed oil and the feeding and manurial value of cotton seed products.

Special attention is called to the papers on the pests of cotton. Planters are urged to make themselves familiar with the insect and fungoid pests and their methods of control in order that they may be in a position to recognize and combat them. Complete descriptions are given of the pests and the appearance of infected plants.

The report embodying the results of the recent visit of Sir Daniel Morris and Mr. J. R. Bovell to the Sea Island cotton districts of the Southern United States will shortly be issued as an Extra Number of the *West Indian Bulletin*.

INSECT NOTES.

Insects and Disease.

Within the past few years much has been learned of the real nature of many of the more epidemic diseases, and the way in which they spread; and it is rather remarkable to realize the part played in their transmission by some of the common insects which abound in so many localities.

Many experiments have been carried out and much research work has been performed in laboratories, principally by medical men and zoologists, with the result that it is now known that flies and mosquitos, which were formerly considered to be merely a great nuisance, are vital factors in the transmission of some of our most troublesome and dangerous diseases. It has been proved that typhoid fever, yellow fever, malaria, and filaria (elephantiasis) are all carried by insects, and many cases are on record where attention to the entomological side of the question has resulted in rendering fever-infested localities comparatively healthy. Typhoid fever, which has been specially troublesome in such places as army camps, emergency hospitals, and similar places, is transmitted by flies; but in this case the insect acts in a purely mechanical way as a carrier of the germs. In such cases it often happens that the ejecta of typhoid patients is not properly disposed of, and is then visited by flies which, alighting on the food of the men as it is being prepared for use, carry the germs of the disease. In the recent war in Cuba much of the sickness of the men was directly traceable to this cause and measures to remedy the evil resulted in healthy camps as far as typhoid fever was concerned. There are, however, other ways in which the typhoid germs are carried, and in this respect the transmission of typhoid differs from the other maladies already mentioned, since it has been proved that each is dependent on a single insect, or group of insects, for its transmission. It also differs in being transmitted directly in the germ without change or without passing any intermediate stage in or on the body of the insect. With mosquito-carried diseases, however, this is different, for it is necessary that a certain time should elapse after the mosquito has bitten the patient, and during this time a definite stage is passed in the life-history of the organism causing the disease.

Mosquitos breed in stagnant or very slowly running waters, and it is in such breeding places that the most effective measures may be directed against them. Kerosene oil sprayed upon the surface of mosquito-infested pools, at the rate of 1 oz. to 15 square feet of surface, will kill all the larvae or wrigglers, thus furnishing a simple and efficient means of disposing of the pests. The oil evaporates from the surface of the water, and the treatment will probably have to be repeated unless all breeding places in a given locality are treated with oil at the same time. Draining will in many cases act as a preventive, since the eggs and larvae already in the water will be killed by drying, and the absence of water will prevent further laying of eggs. By attention to these measures great improvement has been effected in both tropical and temperate countries, which have in the past been undesirable places in which to live on account of the large numbers of mosquitos.

Many books have been published on this subject, some of them of a technical nature, but there are others which, while being scientific and accurate, are yet written in a popular style. Among these may be mentioned *Mosquitos* by Dr. L. O. Howard, of the United States Department of Agriculture, and *Mosquito Brigades* by Major Ronald Ross, F.R.C.S., etc.

Mosquito investigations have been carried on with direct reference to the health and comfort of the human race, but other investigations following very similar lines have resulted in a much better knowledge than was formerly possessed regarding certain diseases of domestic animals. Texas fever of cattle has been, and still is in some places, a serious disease, causing the death of large portions of some herds of cattle. This disease is transferred from affected to healthy animals by the common cattle tick, and was the first disease whose transference by insects was clearly demonstrated. The tsetse fly in Africa acts as carrier of another serious disease; while anthrax is transferred by a large gad fly.

Mr. C. P. Lounsbury, Government Entomologist, Cape of Good Hope, in his report for 1901, describes two other diseases transferred by ticks, one called 'heartwater', affecting sheep and goats, and the other malignant jaundice of the dog. The losses from heartwater disease in South Africa for the past twenty-five years have been very great. Though there are a number of species of ticks which infest these animals, it has been shown by the many experiments of the Entomologist, that only one, probably, has any power to transmit heartwater. Malignant jaundice of the dog is one of the most prevalent and most serious diseases to which dogs are liable in South Africa, and it has unquestionably been proved that one, and only one, species of tick, the dog tick, is concerned in its transmission.

These results will certainly prove of great value to stock raisers in South Africa; and now nothing remains but to complete the experimentation on remedial measures. Dipping is practised with good results in the case of Texas fever. The operation consists of driving the cattle into a bath of insecticides which destroy the ticks without injury to the cattle. As already mentioned in the *Agricultural News* (Vol. II, p. 88), it was found that by cleaning off and destroying all the ticks each night, when the cattle come in from the pastures, the ticks on Cherry Garden estate, Jamaica, were completely exterminated.

TRANSPORT OF SEEDS.

The following note on the transport of rubber seeds is taken from the *Gardeners' Chronicle* of October 31, 1903:—

From a recent number of the *Revue Horticole* we learn that the French Agricultural authorities have recently been experimenting with a view to ascertaining the best methods of introducing seeds from Ceylon to Madagascar. The seeds were those of a rubber tree, *Hevea brasiliensis*. The seeds were stratified (1) in cocoa-nut fibre; (2) in the same material roughly powdered; (3) in powdered charcoal; (4) sown in Ward's cases. The seeds were a month in transit, and on arrival it was found that (1) were in good condition, so that 80 per cent. germinated. In (2) the percentage was not more than 65. In (3) no seeds had germinated on the voyage, and at the end of the year not more than 53 per cent. had germinated. In (4) Ward's cases, all the seeds germinated, and the plants arrived in good condition. Packing in powdered charcoal was in all ways the least satisfactory.

DEPARTMENTAL REPORTS
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BRITISH GUIANA: REPORT ON THE AGRICULTURAL WORK IN THE BOTANIC GARDENS AND THE GOVERNMENT LABORATORY, 1902-3. By Professor J. B. Harrison, C.M.G., M.A., Government Analyst and Deputy Chairman, Board of Agriculture.

During the year the drainage of the cane-fields has been re-arranged and extended. In the past the work in the fields has been much interrupted by flooding. The value of this work has been abundantly demonstrated during the past year.

The work of raising seedling canes has been energetically continued. Seeds were sown from fourteen varieties. Out of some 6,200 seedlings obtained, 3,764 have been planted in the experiment fields. Of the 380 seedlings of 1900, considered worthy of chemical analysis, 170 were selected for further experimental study. Similarly, 127 out of the 290 selected seedlings of 1901 were retained for further trial.

In the large plot experiments on the Brickdam fields, where selected varieties were cut as second ratoons in December 1902, 147 B. gave the best results, with 5·23 tons of saccharose in expressed juice per acre of cane.

From the general deductions as to the action of manures, it appears that nitrogen is without doubt the manurial constituent, the supply of which mainly governs the yield of the plant. On the whole, the most profitable application of nitrogen appears to be in dressings of from 2 to 3 cwt. of sulphate of ammonia per acre.

With regard to phosphatic fertilizers, Professor Harrison is of opinion that their use should be restricted to plant canes, the ratoons being manured with nitrogen only. Basic slag appears to be the most useful source of this constituent.

On the whole, the results of the manurial experiments are confirmatory of those of previous years.

BRITISH GUIANA: REPORT ON A VISIT TO THE POMEROON DISTRICT. By R. Ward, Agricultural Instructor.

This is a report on a visit of inspection to the Pomeroon district, made by Mr. Ward, accompanied by Dr. Evans, formerly Curator of the British Guiana Museum.

A detailed account is given of observations made in the various localities. The chief crops in the district are Liberian coffee and cacao, in addition to a large variety of provisions, plantains, tannias, cassava, corn, etc. As regards the coffee, it is stated that good crops of very fine, large berries are obtained. The plants suffer, however, from the ravages of white ants.

It is reported that the land in the district is rich and capable of yielding heavy crops; the question of drainage is one that requires careful attention.

The cultivation of rice and cocoa-nuts is advocated; while it is thought that the following economic plants might well be grown in the district:—nutmeg, kola, vanilla, pimento, cinnamon, tobacco, and some of the best kinds of rubber, fibre and fodder plants.

LEEWARD ISLANDS: REPORT ON SUGAR-CANE EXPERIMENTS, 1902-3. Part 1. By Francis Watts, B.Sc., F.I.C., F.C.S., Government Analytical and Agricultural Chemist.

The main portion of this report deals with the experiments conducted in the cultivation and selection of improved varieties of sugar-cane suited to the conditions in the Leeward Islands.

It will be found that the Barbados seedling, B. 208, again heads the list both in Antigua and St. Kitt's, although in the latter island Caledonian Queen shares with it the first place. In consequence of these results, Mr. Watts is of opinion that B. 208 is to be recommended to planters.

Three appendices are attached to this report which are of considerable interest. The first deals with the chemical selection experiments, which have been carried on for several years; while in the second an account is given of the efforts made to raise seedling canes in Antigua. We are glad to note that Mr. Sands' efforts have met with success, and the behaviour of these seedlings, when cultivated and submitted to chemical analysis, will be watched with interest. Mr. Watts also reports on his experiments in the treatment of cane plants with germicides before planting. A diagram helps to bring out the results of these experiments, which go to show that Bordeaux mixture is an efficacious agent in preserving cane plants.

SEEDLING AND OTHER CANES IN THE LEEWARD ISLANDS, 1902-3. Pamphlet series, No. 27.

In this pamphlet the main facts contained in the above report are summarized in a handy form.

In the case of both Antigua and St. Kitt's, tables are given showing the positions occupied by the canes experimented upon as plants and ratoons respectively. This pamphlet also has the three appendices, mentioned above, dealing with (1) chemical selection of sugar-canes, (2) the raising of seedling canes, and (3) the treatment of plant tops and cuttings with germicides before planting.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture arrived at Barbados after his visit to the United States and Jamaica on Saturday, November 21. Sir Daniel Morris will proceed to St. Vincent on December 15 and return to Barbados on December 19.

The prospects for holding the next West Indian Agricultural Conference at Trinidad have not improved as was anticipated. Trinidad is still being quarantined by the other colonies and, while this is the case it is difficult to make definite arrangements for the Conference. As already stated it has been found impossible to hold the Conference, as hitherto, at Barbados owing to the changes in the movements of the Royal Mail Steamers.

On Friday, December 12, Sir Daniel Morris and Mr. J. R. Bovell will address a meeting of the Barbados Agricultural Society and give some of the results of their recent visit to the Sea Island cotton districts of the United States. The full report of this visit will, it is hoped, be issued shortly as an extra number of the *West Indian Bulletin.*

GLEANINGS.

At the usual monthly meeting of the Board of Agriculture, Jamaica, held on November 10, it was reported that Mr. Charles Allen, B.Sc., the newly appointed Fermentation Assistant, had arrived in the island and commenced work at the Government Laboratory.

Consequent on the departure from the colony of Mr. Henry Powell on November 6, his Honour the Administrator has been pleased to appoint Mr. Charles Henry Knowles, B.Sc., Resident Master of the Agricultural School, to act as Curator of the Botanic Station, until further notice.

The cotton worm is evidently developing a surprising intelligence. According to a correspondent in the St. Kitt's *Daily Express*: 'these pests are very keen in their instinct: they enter the fields on Saturday nights and by Monday morning their work is done. They seem to know that one does not walk his field on Sundays. My experience tells me this.'

According to the *Port-of-Spain Gazette* of November 19, his Excellency the Governor paid a visit of inspection on November 17 to the fruit-packing sheds where preparations were being made for the shipment of fruit to England. It was expected that 1,500 boxes of oranges would be shipped. The fruit was being carefully selected and wrapped in tissue paper before being placed in the boxes.

Mr. W. N. Sands, Curator of the Botanic Station, Antigua, writes: 'I have found in one or two places that lady-birds were being killed in the cotton fields by people who were under the impression that they were damaging the cotton plants. There still appear to be people who are not acquainted with the use of these insects in destroying plant lice.'

The Royal Mail Company notifies that their vessels will in future carry bananas from Dominica to England, free of freight, the object being to encourage the export of the article in that direction; and we are also told that the fruit will be taken by the 'Yare' from Portsmouth and along the leeward coast. This should be good news to Dominica planters, and the advantages now offered should not be neglected. (Dominica *Guardian*, November 7.)

The following is taken from a circular issued by Messrs. Alexander and Baird, of Beresford, Florida, manufacturers of 'Woodward's Patent Rope Orange Sizer': 'The machine stands level and the fruit is carried by four ropes running on grooved diverging bars. The ropes run over pulleys, which are easily and quickly adjusted. Being carried by the ropes, the fruit cannot possibly be injured in any way, and no clogging or piling up of fruit is possible.' The price of the machine is $35·00.

According to the *Consular Report* on the trade of China for the year 1902, the importations of sugar into that country have increased 44 per cent. The suggestion has been put forward that it may be practicable to cultivate beet root in Manchuria, where popular taste for sugar appears to be on the increase.

While in Jamaica, the Imperial Commissioner of Agriculture, accompanied by the Chairman and several members of the Board of Agriculture, paid a visit to the Prison Farm at Spanish Town. The rice cultivation, part of which is now in flower, was inspected. The various crops, including bananas, yams, peas, etc., were all in a healthy state.

In a letter to the Imperial Commissioner of Agriculture, Mr. Dudley Johnson, Local Instructor at Montserrat, states that the cotton industry is being steadily developed in the island, sixty-five persons being now engaged in its cultivation. Losses have occurred through caterpillars, but the leaf blister-mite has not yet shown itself in the cotton of the small growers. There are several new cultivations of onions which are very promising and entirely free from insect pests.

At the invitation of Mr. E. A. H. Haggart, General Agent in Jamaica of the Imperial Direct West India Mail Service, Sir Daniel Morris, K.C.M.G., paid a visit to the S.S. 'Port Maria' on Tuesday last, and was entertained at luncheon. The party was afterwards taken over the vessel by Mr. Haggart and Captain Parsons. An inspection was made of the refrigerator and the compartments for the storage of fruit. (Jamaica *Daily Telegraph.*)

The United States import goat skins annually to the value of $2,500,000. India supplies one-fourth of these skins, while China, Russia, Brazil and other countries make up the balance. The *Southern Planter* states that probably 20,000,000 goats were required to supply these skins, while the total number of goats in the United States is probably less than 2,000,000, and suggests that there are large areas which might produce goats successfully and in sufficient numbers to supply the entire home demand.

The Jamaica Board of Agriculture has issued a leaflet giving advice to small cultivators as to the right crops to be planted. Cultivators are warned of the great risk they run in planting bananas almost exclusively and neglecting the cultivation of food crops and other economic products. The circular states: 'Every cultivator should be encouraged to grow a sufficiency of food crops as his land will produce to supply the wants of himself and his family, provide seeds and cuttings for the next season's planting and leave a surplus to be disposed of in the nearest market.'

Mr. A. K. Agar, Honorary Secretary of the Dominica Agricultural Society, writes that the Society forwarded, by the mail leaving on November 5, a consignment of fruit as their contribution towards the banquet given by the West India Committee to Sir Nevile Lubbock on November 25. There were twelve different kinds of fruit in addition to preserves. Dr. H. A. A. Nicholls contributed fine grape fruit and mangosteens, and two crates of pine-apples were sent from the Botanic Station. The Royal Mail Company kindly made arrangements to carry the consignment free of charge, and to place the more perishable fruit in the cold storage room.

THE USE OF CARBON BISULPHIDE AS AN INSECTICIDE.

The following information and instructions as to the use of carbon bisulphide as an insecticide are reprinted from a pamphlet prepared by Mr. H. H. Cousins, M.A., F.C.S., Government Analytical and Agricultural Chemist, Jamaica. Mr. Cousins explains that on account of its high volatility and inflammable nature, carbon bisulphide requires special precautions in its package for transit. Owing to the objection on the part of steamship companies to carry it, this article is most difficult to obtain in the tropics. Arrangements have been made by which the Jamaica Government will import it, the Island Chemist having charge of its distribution :—

Properties: Carbon bisulphide is a liquid one-fourth heavier than water (specific gravity, 1·29). One gallon weighs nearly 13 lb. It is very volatile and evaporates rapidly when exposed to the air. It is highly inflammable. Its vapour when mixed with air is liable to explode when ignited. It boils at 115° F. Its vapour is much heavier than air and always tends to flow downwards.

Its vapour possesses a sweetish smell when perfectly pure. The commercial article always has a more or less objectionable odour. It should not be inhaled in any quantity as it causes dizziness and palpitation of the heart. Fresh air is the best treatment in case of a person becoming affected by the vapours.

SIMPLE RULES FOR SAFE STORAGE AND HANDLING.

1. Keep it in the special iron drums, or, if in small quantity, in stoppered bottles. See that the stoppers are tight.
2. Store in a dark, cool place, preferably an outside store where fire or light will not have access to the liquid.
3. In pouring out a supply, take care that no flame or even a lighted cigar or pipe of tobacco is near. Arrange to have the vapour as low as possible so as to avoid breathing it.

INSTRUCTIONS FOR USE.

For the destruction of insects in the soil, root-borers and ants, as well as for sterilizing soil in which seeds or plants liable to injury from insects are to be raised, carbon bisulphide is an effectual agent.

(a) Root-borers: The liquid itself is destructive to any root brought into contact with it. The vapour, however, in regulated quantity is harmless to roots and highly destructive to insect life in the soil. Hot, dry, sandy soils should only be treated when they have been thoroughly moistened with rain or irrigation water. As a general rule, it is desirable in all cases to use carbon bisulphide when the soil is still damp, since its action is thereby better controlled and regulated. Bore holes at the rate of four per square yard to a depth of 12 inches. No hole should be within 18 inches of the tree-trunk. Pour $\frac{1}{4}$ oz. of the liquid down each hole. Special appliances are sold for this purpose enabling two men to make 2,000 injections per diem. For occasional use, the holes should be made with a crowbar and the liquid poured down an iron tube. The earth should be trampled over the hole after treatment. In some cases the holes should slope toward the tree trunk so as to reach insects under the central point.

(b) Ants: When the nest has been located, bore two or more holes to a depth of 1 to 2 feet in the centre of the nest and pour 2 oz. of bisulphide down each hole. Close the hole with earth immediately.

(c) Borers in trees: Where the sawdust and castings indicate an active borer at work, inject a little bisulphide with an oil-can into the hole and stop the opening with clay.

(d) To sterilize soils for seedlings and delicate pot plants: Place the soil in a suitable box or tin with a close fitting lid. Pour on 1 oz. of bisulphide per bushel of soil ; after two days, spread the soil out in the open air. All insect life in the soil will thus have been destroyed. This treatment is found not to injure in any way the fertility of the soil.

(e) To disinfect a granary: Where large quantities of grain are stored in a building and serious losses through weevils and other insect pests occur, it is a great advantage to treat the whole building with carbon bisulphide. To do this certain obvious precautions are necessary :—

(1) The building must be made fairly tight. Ventilators must be papered over and doors made to shut close.
(2) Preparations must be made so that a number of men can enter the granary simultaneously, each to pour out in a prepared receptacle the requisite dose of bisulphide and then immediately to retire. The building should then be kept close for forty-eight hours and all windows and doors opened for four hours before it is again occupied by men.
(3) Stringent precautions to preclude any chance of firing the inflammable vapour must be taken.

For every 25 square feet of floor space supply 1 square foot of evaporating surface (flat tins or dishes).

Each pan or dish should receive 1 lb. of liquid. The dishes should be placed on level supports 4 feet from the ground. An entire store of grain could thus be freed of insects at one operation extending from Saturday to Monday.

(f) To free grain from insects on a smaller scale: Carbon bisulphide in the proportions here recommended will destroy insects in grain without affecting the germinating powers of the seeds.

Every person who stores corn, peas or other grain subject to insect attacks should prepare a fumigating box as follows :—

Obtain a barrel, puncheon or packing case of suitable size. Line the inside with building paper stuck on with a mixture of varnish and whitening (chalk). Construct a lid which can be fastened down firmly on a bearing coated with felt. For every 50 cubit feet of space in the receptacle employ 1 oz. of bisulphide. For an ordinary flour barrel one teaspoonful ($\frac{1}{8}$ oz.) of bisulphide should suffice, if the receptacle be tight and free from leaks.

Place the bisulphide in a saucer on the surface of the grain, keep tightly closed for thirty-six hours.

(g) Clothes Moths: Great damage to clothes is done in the tropics by various species of moths. Camphor and naphthaline or pyrethrum insect powder tend to keep the adult insects away, but the former, at any rate, have no effect on the larvae when they have once commenced their attack on the clothing.

Before putting clothing, woollens, or furs into store it is advisable to treat them with carbon bisulphide. An ordinary tin trunk can be used if newspapers are spread over the top and the lid kept tightly closed. Pour half a wine glass-full of the liquid on the surface of the clothing, spread the papers quickly and shut tight. Should the box be opened at intervals afterwards, naphthaline balls or insect powder serve to keep away a fresh infection. The liquid will not injure the clothing or leave any stain.

(h) Household Insects: Should it be desired to destroy cockroaches, bed bugs or fleas in a house, it should be treated on the lines laid down for disinfecting a granary.

A suitable time for this treatment would be an occasion when the house is to be shut up for three or four days or longer. Individual rooms could be treated, if desirable. Stringent precautions to avoid ignition of the vapours or their inhalation by human beings are of course necessary.

(i) Insects in Tobacco, Museum specimens and Books: These can be readily destroyed by treatment in a suitable closed vessel with carbon bisulphide. If the receptacle be tight, 1 oz. of bisulphide will suffice for each 50 cubic feet of space. The treatment should last for thirty-six hours.

AUTHORITIES UTILIZED.

Carbon Bisulphide as an insecticide: W. E. Hinds.
Farmers' Bulletin 145, U.S.A. Dept. of Agriculture.
Insects affecting Tobacco: L. O. Howard.
Farmers' Bulletin 120, U.S.A. Dept. of Agriculture.
Household Insects of U.S.A.: F. H. Chillenden.
Chemistry of the Garden: H. H. Cousins. Macmillan & Co., Ltd.

LECTURES TO PLANTERS AT BARBADOS.

The following is a summary of the second of the course of lectures being given to planters by Mr. Lewton-Brain on the subject of the diseases of the sugar-cane. The subject of the lecture was: 'The Sugar-cane in Disease.':—

A diseased plant may be defined as one in which one organ, or more, is not performing its proper functions, or not performing them to its fullest extent.

Disease may be brought about by the action of one or both of two sets of causes—internal and external. As external causes of disease may be mentioned drought, improper mechanical or chemical condition of the soil, poisonous gases or fog in the air, etc.

It was pointed out in the last lecture that some fungi are only able to obtain their carbonaceous food from dead organic matter, these are the 'obligate saprophytes'; others are only able to obtain it from living organisms, they are 'obligate parasites'; again others can exist and reproduce on dead organic matter, but are also able to enter and destroy the tissues of living plants and so obtain their organic food, they are 'facultative parasites' and are difficult to deal with. Most of the fungi attacking the sugar-cane are facultative parasites.

RIND DISEASE.

The first sign of the rind disease that is usually noticed is the gradual drying up of the outer leaves of the top, this proceeds until the whole top is dry. The internodes, on being cut open, show a reddish or brownish discolouration. Later, we get a sunken, discoloured area visible from the outside. Finally all the internodes become discoloured and shrunken, while the cane shows numberless little, black, hair-like bodies projecting through the rind; these are masses of the spores of the rind fungus loosely cemented together.

These spores if inserted into a wound on the stem, will infect the cane with rind disease. They cannot, however, infect a plant in which the epidermis is intact. Under natural conditions, the spores probably gain entrance to the stem, in most cases, by means of the tunnels of boring insects.

The hyphae put out from the spore are able to enter the thin-walled cells of the stem, they branch and grow in this tissue, consuming and destroying the sugar stored there and killing the cells. The fungus is also able to enter the cavities of the wood vessels and there intercepts the current of water and food salts which is passing from the roots to the leaves. The plant is then unable to manufacture the food it requires for its actual growth and life.

When about to reproduce, the hyphae, close under the rind, begin to branch vigorously and interweave, forming a thick cushion: those hyphae nearest the surface grow out parallel to one another and begin to cut off spores. Thousands of these spores are produced, until finally the rind of the stem is ruptured, and the spores emerge in a mass, like a curly, black hair.

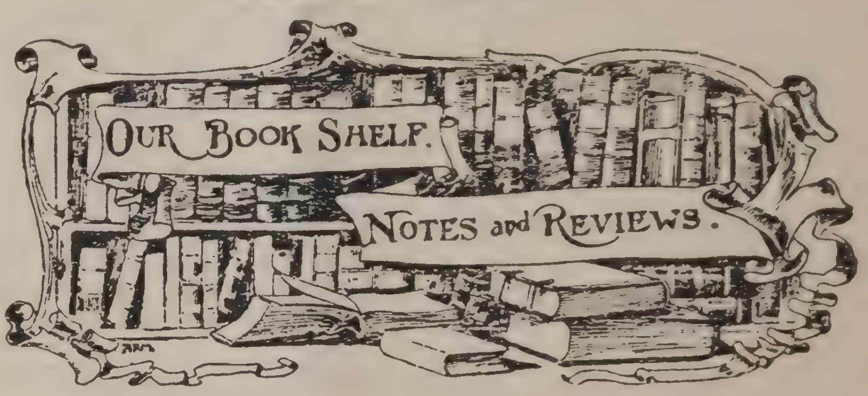
The chief means of dealing with this disease are as follows:—

1. The destruction of rotten canes which serve as breeding places for the fungus. This should be prompt and general.
2. The prevention of wounds, by attacking the boring insects which produce them.
3. Rotation of crops.
4. The use of perfectly healthy cuttings.
5. Attention to cultural methods.
6. The selection of resistant varieties of cane.

PINE-APPLE DISEASE.

This disease attacks cuttings and prevents their proper development. It is more abundant in a dry than in a wet planting season, because then the plants make less vigorous growth and so more readily fall victims to the fungus.

Cuttings may be infected by dipping them in water containing the spores of the fungus. Infection takes place at the cut ends and at any wounds. Treating the cuttings by soaking them in Bordeaux mixture and then tarring the ends has been found to prevent infection. It still remains to be seen whether it will pay to adopt this treatment on an estate scale. Experiments carried out in Barbados on a large scale in December 1902 were inconclusive. In any case, no cuttings which show the tunnels of any borer should be used.


OUR BOOK SHELF.
NOTES and REVIEWS.

THE CULTURE OF THE CENTRAL AMERICAN RUBBER TREE. By O. F. Cook. *Bulletin No. 49 of the United States Department of Agriculture, Bureau of Plant Industry. Washington, 1903.*

The preface to this work states that the paper 'is the result of a preliminary study of rubber culture in Guatemala and Southern Mexico by Mr. O. F. Cook, Botanist in charge of investigations in Tropical Agriculture.'

After referring to the multiplication of the uses of rubber and the increasing demand for the raw material, the author points out the possibilities of developing rubber cultivation along scientific lines.

The work deals at considerable length with the status of *Castilloa* rubber culture, the botanical study of *Castilloa* and the problems connected with the latex.

A detailed account is given of the cultivation of the Central American rubber tree and methods of extracting and coagulating the latex.

Rubber planters in the West Indies will find much useful information in this work, and the eighteen full page illustrations showing the various parts of the tree, as well as methods of tapping and coagulating certainly increase its value.

We note, however, that the author has departed from the usual custom with regard to the nomenclature of the Central American rubber tree. The name *Castilla* is here used, whereas the usually accepted name is *Castilloa*. We cannot condemn such a practice too strongly; especially in the case of a work of a popular character.

Pollen Bread. The *Annual Report of the Indian Museum* for 1902-3 makes mention of a peculiar food product brought to notice during the year. The yellow pollen of the elephant grass (*Typha angustifolia*) is used as flour and made into bread in Sind and Bombay. It has the following composition:—Water, 8·40; oil, 2·70; carbohydrates, 44·50; albuminoids, 19·75; cellulose, 17·80; and ash, 6·85.

MARKET REPORTS.

London,—November 10, 1903.—Messrs. Hales Caird & Co., Messrs. E. A. de Pass & Co., Messrs. Kearton, Piper & Co.; 'The West India Committee Circular,' Novmeber 9; 'The Liverpool Cotton Association Weekly Circular, November 6; and 'The Public Ledger,' November 7, 1903.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 30/- per cwt.
Arrowroot—St. Vincent, 1¾*d.* to 3½*d.* per ℔.; Bermuda, 1/3 to 1/8 per ℔.
Balata—1/11½ to 2/4 per ℔.
Bees'-wax—£7 10*s.* to £7 15*s.* per cwt.
Cacao—Trinidad, 66/ to 76/- per cwt.; Jamaica, 51/- to 61/6 per cwt.; Grenada, 52/- to 64/6 per cwt.; Dominica, 52/- to 60/- per cwt.; St. Lucia, 52/- to 60/- per cwt.; Demerara, 66/6 to 68/- per cwt.
Cardamoms—Mysore, 8*d.* to 2/4 per ℔.
Coffee—Jamaica, 34/- to 113/6 per cwt.
Copra—Trinidad, £14 15*s.* per ton, c.i.f.
Cotton—West Indian, 6*d.* to 6½*d.* per ℔.
Fruit—
  Bananas—Jamaica, 7/- to 8/- per bunch.
  Grape Fruit—12/- to 13/- per case.
  Oranges—Jamaica, 9/- to 12/- per case.
  Pine-apples—No quotations.
Fustic—£3 10*s.* to £4 per ton.
Ginger—Jamaica, 37/- to 60/- per cwt.
Honey—Jamaica, 18/6 to 28/- per cwt.
Isinglass—West Indian lump, 2/3 to 2/8; Cake, 1/3 per ℔.
Kola Nuts—4*d.* to 7*d.* per ℔.
Lime Juice—Raw, 10*d.* to 1/3 per gallon; Concentrated, £12 15*s.* to £13 10*s.* per pipe. Distilled Oil, 1/5; Hand pressed, 2/6 to 2/9 per ℔.
Logwood—£4 2*s.* 6*d.* to £5. Roots, £4 to £4 10*s.* per ton.
Mace—1/11 to 2/6 per ℔.
Nitrate of Soda—Agricultural, £10 per ton.
Nutmegs—69's to 60's, 2/4 to 3/- 75's to 70's, 2/- to 2/3; 90's to 80's, 1/6 to 1/11 per ℔.
Pimento—4*d.* to 4⅜*d.* per ℔.
Rum—Demerara, 9½*d.* to 11*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.
Sarsaparilla—Jamaica. 9½*d.* to 1/ per ℔.
Sugar—Crystallized, 15/1½ to 16/6 per cwt.; Muscovado, 11/- to 14/6 duty paid; Molasses, 11/- to 15/6 per cwt.
Sulphate of Ammonia—£12 5*s.* per ton.
Tamarinds—Antigua, 7/6 to 8/6 per cwt.

Halifax, N.S.,—October 20, 1903.—'The Maritime Merchant.'

Ginger—Jamaica, 24c. pure bulk.
Hay—$13·00 to $14·00 per ton.
Molasses,—Porto Rico, 43c. to 44c.; Barbados, 39c. to 40c.; Antigua, 33c. to 35c.; Trinidad, 44c. to 45c.
Nutmegs—50c. to 60c.
Pine-apples—$1·50 to $2·25 per dozen.
Potatos—40c. to 50c. per bushel.

St. John, N.B.,—October 20, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 41c. to 44c.; Barbados, 38c. to 39c. per gallon.

New York,—November 13, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.
Cacao—African, 12c. to 12½c.; Caracas, 13½c. to 15c.; Jamaica, 10½c. to 12½c.; Grenada, 13c. to 13¼c.; Trinidad, 13¾c. to 15c. per ℔.
Cocoa-nuts—Trinidads, $16·00 to $18·00; Jamaicas, $20·00 to $22·00 per M. selected.
Coffee—Jamaica, fair to good ordinary, 6c. to 7c. per ℔.; Manchester grades, 8½c. to 11c. per ℔.
Ginger—Jamaica, 7½c. to 8½c. per ℔.
Goat Skins—Jamaicas, 50c. to 53½c. per ℔.
Grape Fruit—No quotations.
Onions—No quotations.
Oranges—$3·50 to $4·00 per barrel.
Pimento—7¾c. to 8c. per ℔., ex store.
Rubber—No quotations.
Sugar—Centrifugals, 96°, 3¾c.; Muscovados, 89°, $3\frac{5}{16}$c.; Molasses, 89°, $3\frac{1}{16}$c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—November 21, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 to $3·75 per 100 ℔.
Cacao—$10·50 to $11·00 per 100 ℔.
Cocoa-nuts—$10·00 per M. (husked nuts).
Coffee—Jamaica, $7·50 to $8·50; ordinary Rio, $9·00 per 100 ℔.
Hay—New Brunswick, $1·05 to $1·20 per 100 ℔.
Manures—Nitrate of soda, $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00 per ton.
Molasses—No quotations.
Onions—Madeira, $3·00 per 100 ℔.
Potatos, English—$2·00 to $3·00 per 160 ℔.
Rice—Ballam, $4·75 to $4·85 per bag (190 ℔.); Patna $3·60 to $3·75 per 100 ℔.; Rangoon, $2·85 to $3·00 per 100 ℔.
Sugar—No quotations.

British Guiana,—November 19, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8·75 to $9·00 per barrel.
Balata—40c. to 42c. per ℔.
Cacao—Native, 11c. to 12c. per ℔.
Cassava—96c. per barrel.
Cocoa-nuts—$8·00 to $10·00 per M.
Coffee—Rio and Jamaica, 11c. per ℔. (retail).
  —Creole, 10c. to 11c. per ℔.
Dhal—New, $3·50; Old, $3·35 per bag of 168 ℔.
Eddoes—60c. to 96c. per barrel.
Molasses—Vacuum Pan yellow, 15c. per gallon, casks included.
Onions—Madeira, 3c. to 3½c. per ℔. ex store. Garlic, 6c. to 7c.
Pea Nuts—Curaçoa, 3¾c.; American, 5c. per ℔. (retail).
Plantains—20c. to 40c. per bunch.
Potatos, English—$4·00 per barrel.
Rice—Ballam, $4·60 per 177 ℔., ex store; Patna and Seeta, $5·65 to $6·00 per 177 lb.
Sweet Potatos—Barbados, 96c. per barrel.
Tannias—$2·28 per bag.
Yams—White, $2·40 per bag.
Sugar—Dark Crystals, $2·00 to $2·85; Yellow, $2·20 to $2·40; White, $3·50; Molasses, $1·70 to $1·90 per 100 ℔.
Timber—Greenheart, 32c. to 55c. per cubic foot.
Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—November 18, 1903.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co., November 19, 1903.

Balata—Venezuelan, no quotations.
Cacao—Ordinary, $13·75 to $14·00; Estates, $14·75 to $15·00 per fanega.
Cocoa-nuts—American, $15·00 per M.
Coffee—Venezuelan, no quotations.
Copra—$2·40 to $2·65 per 100 ℔.
Onions—$2·60 to $3·50 per 100 ℔.
Potatos, English—$1·20 to $1·33 per 100 ℔.
Rice—Yellow, $4·25 to $4·60; White Table, $5·40 to $5·80 per bag.
Sugar—Crushed, $5·50 per 100 lb.

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[46.]

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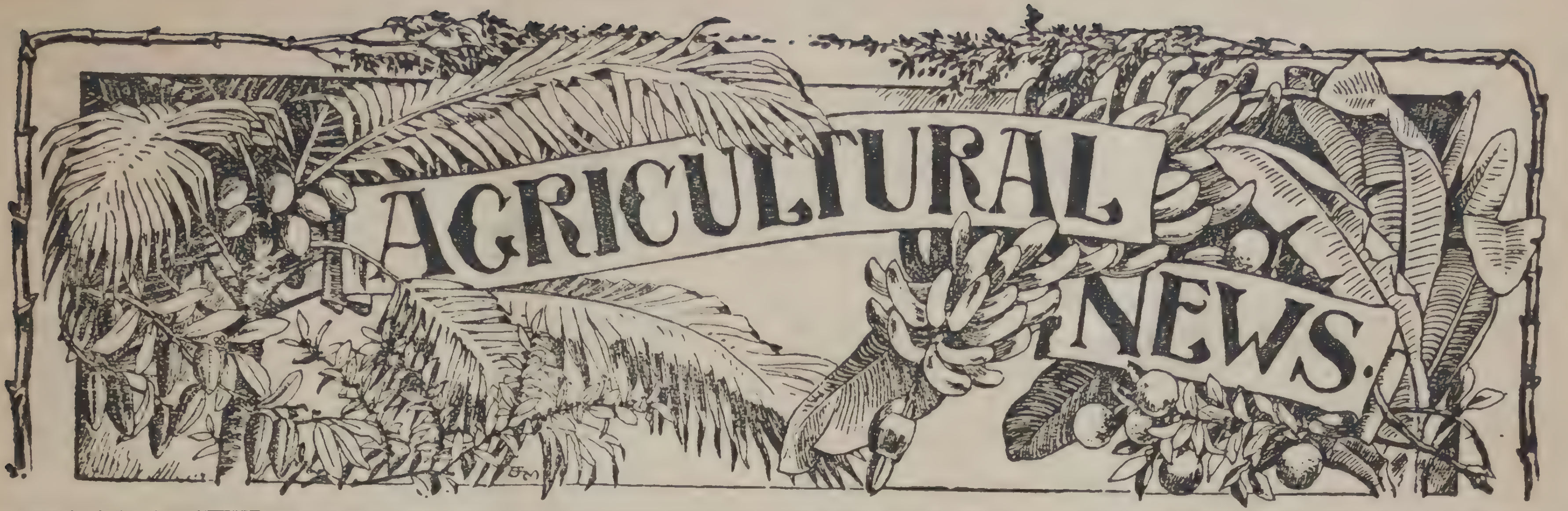

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. II. No. 44. BARBADOS, DECEMBER 19, 1903. PRICE 1*d*.

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Cotton Seed for 1904.

DURING the planting season of 1903, the demand for cotton seed was so unexpectedly large that it was almost impossible to deal with it. Fortunately the British Cotton Growing Association was in a position to afford valuable assistance in the matter, and it is probable that nearly 1,000 bushels of cotton seed were presented by the Association to various persons in the West Indies up to September last. In addition, seed was obtained by the Imperial Department of Agriculture from the Southern United States, from Egypt and Peru. In most cases the seed was distributed free of cost.

For the purpose of practically testing the capabilities of the various kinds of cotton under the conditions existing in the West Indies, a large variety of seed was tried. At present there is planted in these islands a considerable area in several sorts of Sea Island cotton and there are smaller areas in Egyptian cotton, in the several sorts of Upland cotton, Peruvian cotton, and in a few local forms that have been found in a more or less wild condition at St. Lucia and Barbados, or under cultivation by small settlers at Carriacou.

It is too early yet to speak definitely as to the relative value of all these; but there can be no doubt, as already recommended by the Imperial Department of Agriculture, that the best all-round varieties for cultivation in the West Indies are the fine, long-stapled sorts of Sea Island cotton. The plants themselves are hardy and easily cultivated and the return, in value, (though not always in weight of lint per acre) is larger than that from other cotton. It is stated that the best Sea Island cotton can only be grown successfully in districts more or less under the influence of sea-air. We may conclude, however, that there is no part of these islands, with moderately good soil, where Sea Island of some sort cannot be grown.

Owing to the possibility of crossing with other varieties, the seed of Sea Island cotton obtainable this year in the West Indies cannot be depended upon. In fact it would be unwise to use any local seed for establishing cultivation in 1904. In subsequent years, local seed might be carefully selected and attempts made to raise strains specially suited to the West Indies.

Cotton is usually planted in the United States in April of each year. All the best seed for planting purposes is usually taken up before that time. With the view of securing, beforehand, a large supply of seed of the best Sea Island cotton for these colonies, the Imperial Commissioner of Agriculture, during his recent visit, obtained the refusal of all the seed produced on one of the most successful plantations on the sea-board of South Carolina. On this plantation the proprietor has for several years carried on experiments, in conjunction with the United States Department of Agriculture, in raising disease-resisting varieties as described in the *West Indian Bulletin* (Volume IV, pp. 201-14). The lint is of fine quality and has uniformly obtained high prices. The seed will be carefully cleaned and assorted, and will be delivered with a guarantee that it is the produce of this plantation and no other.

It is estimated, as already announced on p. 379 of the *Agricultural News*, 'that this seed will cost, delivered to the planters in the West Indies, about 7 cents per ℔. (or at the rate of 1*s*. 9*d*. per acre), and as it will have to be paid for when ordered, those requiring it should note that it must be paid for in advance.' The date for closing orders for this seed has now been extended until the mail due at Barbados on January 4, 1904. After that date the Department will be unable to procure any further supplies of this selected Sea Island cotton seed. It will, however, continue to assist in obtaining other seed; but the latter may not be of so good a quality, and it may cost more.

It would be convenient that all correspondence relative to the supply of the selected Sea Island cotton seed, above referred to, should be addressed to the local officers of the Department, who will receive payments in advance, and give due acknowledgements for them. The seed will be deliverable in the West Indies about the end of January or the beginning of February. After its arrival it will be necessary to store it under suitable conditions until required for planting in June, July or August next.

SUGAR INDUSTRY.

Sugar-cane Experiments in British Guiana.

The following is a progress Report by the Sugar-cane Experiments' Committee on the results of the experiments with sugar-canes in British Guiana during the crop season July 1, 1902 to June 30, 1903. The Committee has also published tables giving the mean results obtained with the different varieties on sugar-cane plantations:—

Twenty-one of the plantations which have placed their results at the disposal of the Board have carried on large-scale experiments during the crop year 1902-3, and the following shows the number of experiments which they have carried on with certain varieties of canes and the acreage occupied therewith:—

Variety.	Number of experiments reported.	Acreage occupied.
Bourbon	21	6,895
White Transparent	35	1,036
D. 109	34	601
B. 147	19	326
D. 95	9	99
D. 78	11	95
D. 145	16	90
D. 74	12	79
D. 625	12	40
Sealy	6	25

A large number of experiments with other varieties were reported, but as they were either small-scale experiments, in which each variety occupied a lesser area than 1 acre, or in which a variety had been experimented upon on less than six plantations, the results, although in many cases interesting, are not included in this report.

The following gives the mean yields and the true average yields of commercial sugar in tons per acre:—

Variety.	Mean.	Average.
D. 625	2·52	2·91
D. 145	2·17	1·97
D. 109	2·14	2·04
Sealy	2·08	1·96
D. 95	2·06	3·13
D. 74	2·04	1·92
B. 147	1·95	1·87
White Transparent	1·86	2·05
D. 78	1·83	1·61
Bourbon	1·76	1·89

The mean yields do not represent the actual yields per acre obtained, as the areas of the experiments varied greatly; but as they are affected more by the locality of the experiments and less by the area in any one locality than are the true averages, I am inclined to think that they are more reliable guides to the relative values of varieties than are the true averages. As an instance of this may be mentioned the true average yield of D. 95, 3·13 tons, a return due to the exceptionally high yield of this variety in one experiment over a relatively large area, and which hides the significance of the lower yields in the other experiments conducted on lesser areas.

The tables attached to the report give, in the case of each variety reported upon, the means of the data supplied with regard to both plant and ratoon canes and to plant canes and ratoons separately. As comparison of the figures obtained from the experimental fields at the Botanic Gardens with those from estates given in last year's report conclusively proved that no reliable deductions can be formed from small experiments with varieties of canes regarding their probable yields, when cultivated under estates' conditions and on the manufacturing scale, I have not included in the tables any records from the experimental fields. These results may be found in the *Report on Agricultural Work in the Botanic Gardens and the Government Laboratory for 1902-3.*

As in 1901-2, the value of the data varies greatly, the results recorded where the experiments have extended over large areas and on several plantations being generally more reliable than where the areas are small and the number of experiments reported few.

The following shows the mean yield of each variety in tons of commercial sugar per acre during the two years 1901-2 and 1902-3, and the means of the yields of the two crop-years:—

Variety.	Crop of 1901-2.	Crop of 1902-3.	Mean. 1901-3.
D. 625	2·95	2·52	2·745
Sealy	2·49	2·08	2·285
D. 145	2·17	2·17	2·17
D. 95	2·24	2·06	2·15
D. 74	2·03	2·04	2·035
D. 109	1·91	2·14	2·025
Bourbon	2·18	1·76	1·97
B. 147	1·99	1·95	1·97
White Transparent	2·03	1·86	1·945
D. 78	1·39	1·83	1·61

MILLING QUALITIES OF THE VARIETIES.

The opinions expressed as to the milling quality of a variety differ rather widely. D. 625, in one instance, is reported as 'good', in all others, as from 'bad' to 'fair': D. 145 is described as from 'very bad' to 'fair,' the majority of reports not being in its favour: D. 109 varies from 'bad' to 'good,' the majority of reports being 'fair': Sealy is described as 'fair' and as 'good': D. 95 also as 'fair' and as 'good': D. 74 is returned in one case as 'poor,' in all others as 'good': B. 147 in one case as 'very bad,' in one as 'bad,' and in the remaining ones as 'good': White Transparent varies from 'bad' to 'good,' the general opinion being that it is either 'poor' or 'fair': D. 78 is almost unanimously described as 'bad' or as 'very bad'; while Bourbon is returned either as 'fair,' as 'good' or as 'very good.' In factories having crushers before the mill-rolls, the milling qualities of all the varieties are reported as being satisfactory.

QUALITY OF THE MEGASS AS FUEL.

Here again, wide differences of opinion are recorded. That of D. 625 is described as 'poor', as 'fair,' and as 'good': of D. 145 as 'bad,' as 'fair,' and as 'good': of D. 109 as 'very bad,' 'bad,' 'poor', 'fair' and 'good': of Sealy as 'fair' and 'good': of D. 95 as 'very bad' to 'fair': of D. 74 as 'fair' and 'good': of B. 147 as 'very bad,' 'bad', 'fair' and 'good,' the more favourable expressions preponderating: of the White Transparent as 'very bad,' 'bad', 'poor', and in one instance as 'good,' unfavourable opinions being nearly universal: of D. 78 as 'bad' and in two cases only as 'fair': while in only one case was that of the Bourbon recorded as other than 'good.'

It is evident that the milling quality of the canes and the fuel value of the megass are not purely characteristics of varieties, but are largely dependent on soil, climatic and meteorological conditions.

It is not advisable to draw any wide-reaching deductions from these experiments. They, however, indicate that several varieties of sugar-canes may be relied upon to give, in British Guiana, yields of sugar in quantities equal to or greater than those of the Bourbon, and that several of the varieties, for instance, D. 109, D. 74 and D. 95, possess well-marked ratooning powers.

Under satisfactory conditions the marked differences in the saccharine strength of the expressed juice of the canes, so very noticeable in small-plot experiments with sugar-canes, tend to disappear. The following shows the calculated expression of the juices, their contents of saccharose in pounds per gallon, their quotients of purity, and their quotients of non-sugars:—

	Extraction.	Saccharose in pounds per gallon.	Quotient of Purity.	Quotient of Non-sugars.
D. 625	67·5	1·397	81·2	11·8
D. 145	67·9	1·469	83·7	10·6
D. 109	67·6	1·406	83·8	10·6
Sealy	67·1	1·442	81·7	13·1
D. 95	60·1	1·543	84·6	10·6
D. 74	64·4	1·500	83·9	11·0
B. 147	63·5	1·354	79·8	14·0
White Transparent	64·9	1·480	86·1	5·3
D. 78	70·7	1·360	79·8	13·8
Bourbon	69·3	1·547	84·7	8·9

In considering these results it must be borne in mind that in the cases of the majority of the experiments the varieties other than Bourbon have been grown on land on which the latter cane does not flourish, while the Bourbon returns are, as a rule, from land of average quality.

Experiments in Feeding Molascuit.

The following interesting account of experiments, conducted by Mr. J. G. Lumb, of Buenos Ayres, with a view to testing the value of molascuit as a cattle food, is taken from *Our Western Empire*, of October 15:—

Molascuit has now had a very fair trial in Buenos Ayres, and has proved a very great success. Mr. J. G. Lumb placed it on that market, and in order to give it a severe trial he placed two lean steers and two lean milch cows on public exhibition. On entering the yard the red steer weighed 595 kilos, and the roan steer 584 kilos. One cow having taken a severe cold, was withdrawn. The cattle were first fed with this new food on the morning of August 10, at the rate of 4 ℔. each per meal of two meals daily, or in other words, they began by consuming 8 ℔. daily. After twenty days the steers weighed as follows:—Red steer, which weighed 595, had advanced to 650 kilos, or 55 kilos in two-thirds of a month. The roan, which turned the scales at 584 kilos when placed in the yard on August 10, then weighed 638 kilos, or an increase of 54 kilos for twenty days. The cow, which weighed in at 495, then weighed 505 kilos, and she had increased her milk from 4 litres on the day of her entry to 7¾ litres.

WEST INDIAN FRUIT.

HYBRIDIZATION OF PINE-APPLES.

We take the following extracts from a description of a visit to the Botanic Gardens at Hope, Jamaica, by Dr. James Neish, published in the *Journal of the Jamaica Agricultural Society* for November. An interesting account is given of the efforts that are being made to produce hybrid pine-apples :—

Before reaching that part of the Garden where the pinery beds are located, Mr. Fawcett treated us to a most impressive sight, that of witnessing the progress which is being made in experimental hybridization of pines.

The superior qualities of the Ripley varieties as to flavour, and the excellent qualities of the Smooth Cayenne as to large size and weight, good keeping and ability to bear long transport, gave rise to the idea that if the two varieties could be crossed, the hybrid product would most likely partake of the mixed qualities of both parents. This process in horticulture is known as cross-pollination or cross-fertilization. It is the method whereby numerous fruits—apples, pears, grapes, etc.—have been produced. It was practised at Hope, with the idea mentioned, in 1901; but this year the operation has been conducted on a much larger scale, apparently, therefore, with an increased numerical probability of success. It is well known to horticulturists that very many cross-seedlings may be produced without much success as to the desired result of producing a better plant. It is recounted that many thousands of worthless grape-seedlings have been grown before one good or better grape-vine could be established. Hence the value of, and even necessity for, trials on a numerically extensive scale.

At Hope, during the present year, it is gratifying to observe that these operations are on a scale at least large enough to deserve, if not indeed to command, success.

The flower of the pine-apple is both staminate and pistillate; that is to say, it contains six stamens and one pistil; it is thus a flower which is readily fertilized by simple agencies. Artificially, these agencies have to be controlled. The proposition is to remove all simple agencies from action upon the flowers of the Ripley. This is done by cutting out the stamens from all the blossoms of the Ripley before the anthers have ripened their pollen, and by protection from external agencies by wrapping up the flower-head with fine gauze. Then the maturity of the stigma forming the summit of the pistil is watched for. At the proper moment pollen-dust from the stamens of the flowers of the Smooth Cayenne is applied to the moist and adherent stigma of the Ripley, and the flower-head is again wrapped up, and so protected against any other mode of pollination, which would of course impair and render uncertain the result.

That this delicate operation has been skilfully performed at Hope is shown by the abundance of the seed obtained and the large number of seedling plants procured. I estimated that there are this year between 1,500 and 2,000 seedling plants thus cross-fertilized and known as Cayenne x Ripley, growing in the nurseries at Hope, so that there is surely a hopeful chance of more than one superior variety being evolved.

UNITED STATES BANANA TRADE.

An interesting account of the development of the banana trade in the United States, is given in an article, reprinted from the St. Paul *Pioneer Press*, which appeared in the Limon *Weekly News* of October 31. We take the following extracts :—

The growth and development of the banana trade—hardly forty years old—and the work accomplished by the men who have built up one of the great industries of our time, make an interesting story.

The first recorded importation of bananas is that of the schooner 'Reynard' from Cuba to New York in 1804. Her consignment was thirty bunches. Small cargoes were received from Cuba from time to time, but no effort was made to effect regular importations until about 1865, when Charles Frank undertook the importation of fruit from Colon. The exportations of bananas from Colon still continues, but in a small way.

About 1870, Captain L. D. Baker, sailing between Boston and Jamaica, saw the great future of the banana trade and started to work. In 1879, the value of bananas exported from Jamaica was about $160,000. For the year ended March 1901, the value was over $3,000,000—about 33 per cent. of the entire exports of that colony.

About 1880, Minor C. Keith, of New York, holding big railroad interests in Costa Rica, saw the possibilities of the banana industry and at once began the development of large plantations near Port Limon. The shipments from Port Limon in 1881 were 3,500 bunches; in 1891, 133,717 bunches; while in 1902, 4,560,042 bunches were exported.

Nutmeg Cracking Machine. In reference to a statement made in the *Agricultural News* (Vol. II, p. 346), on the subject of a nutmeg cracking machine invented by Mr. John Rudder, of Grenada, the inventor states that the machine 'will only damage nutmegs which are not sufficiently cured, or which are in an unhealthy state.'

COTTON.

Diseases of Cotton.

A special meeting of the Barbados Agricultural Society was held on Friday, December 12, at which an address was delivered by Sir Daniel Morris and Mr. J. R. Bovell giving some of the results of their recent visit to the Sea Island cotton districts of the United States.

The following is a summary of Sir Daniel Morris' remarks on the diseases of cotton with special reference to cotton in Barbados:—

In the United States there are several very destructive diseases affecting cotton. Among the most dreaded of these is the Mexican Boll worm. This has not yet reached the Eastern portions of the cotton belt. It has, however, been reported from Cuba, and on that account it is undesirable that any cotton seed, or indeed any portion of the cotton plant, should be introduced from that island into the British West Indies. A disease, known as 'Wilt' or 'Frenching', affects Sea Island cotton in Carolina, Georgia and Florida. It is being kept in check by raising varieties resistant to this disease. Neither the Mexican Boll worm nor the wilt disease has so far been observed in these islands. I was careful from the first to point out that we could not hope to grow cotton here without having to deal with disease of some sort or kind. In February last, it was stated in the *Agricultural News* (Vol. II, p. 50): 'Pests will probably appear commonly where cotton is grown and they may be looked for and at once dealt with. If pests are expected as part of the regular routine of cultivation, they are less likely to be feared.' Again, in the *Agricultural News* (Vol. II, p. 242) there appeared the following: 'Finally we would repeat what we have already endeavoured to impress upon the planters, viz., that they should keep a watchful eye for insect and fungoid pests, and immediately communicate specimens and seek the advice and assistance of the officers of the Imperial Department of Agriculture.'

Among the pests that have troubled cotton at Barbados this year, the most widely spread and destructive has been the caterpillar or 'worm' of a moth (specimens of which are on exhibition in the Hall) known as *Aletia*. The attack of this insect was so sudden and severe that the damage was done before the planters realized what was going on. There was also the drawback that there was only a small supply of Paris green in the island. The life-history of the insect is well known and it is fully given in the current number of the *West Indian Bulletin* (pp. 268-71). I am of opinion that if a keen look-out be kept for the cotton worm in September and October of each year and immediate steps be taken to deal with it as advised by the officers of the Department, there is every probability that it can effectually be kept in check. In the United States, where it is equally abundant if not promptly dealt with, the planters do not regard it as troublesome. They treat it when the worm is only about $\frac{1}{8}$–$\frac{1}{4}$ inch in length; and one or two dustings with Paris green and lime in the proportion of 1 to 6 are sufficient to get rid of it. We must recognize that at Barbados, with practically the whole of the available land under constant cultivation and with a dense population, the conditions, from the agricultural point of view, are becoming more and more artificial. The fight with pests must be accepted as inevitable: and it is only by intelligent and energetic action on the part of all members of the planting community that we can hope to raise large and remunerative crops. We might assist in placing matters in a more natural condition by planting trees on all waste areas and by encouraging birds, lizards and all insectivorous members of our fauna. If we had large areas under trees, our climate would be more moist and less liable to suffer from severe spells of dry weather; and if we had double or treble the number of insectivorous birds that we have at present, conditions, as regards some pests at all events, would be greatly improved.

Besides the cotton worm there are several fungi causing disease or blight on leaves and pods. It has been noticed that these are more prevalent on ratoons than on plants. At present it is inadvisable to attempt to raise any ratoon crops of cotton. After this year's crop is raised, it would be better to get rid of everything and make an entirely fresh start next year. After a careful review of all the circumstances and after visiting most of the areas planted with cotton this year, I am convinced that, with thoroughly intelligent and active treatment of the cotton worm and other pests, no insuperable difficulty has yet presented itself in the way of establishing a successful cotton industry in this island.

Cotton Cultivation in India.

The following extract is taken from the *Annual Report* on the Government Botanic Gardens, Saharanpur, 1902-3, published in *Indian Planting and Gardening* of October 31:—

A very fine variety of cotton (Dale's Egyptian) was raised from seed received from the Barrage Gardens, Egypt. The pods were large, plentifully produced, and were well-filled with a fine, long, silky fibre. In Egypt, I find that cotton is always sown towards the end of February and not in June-July, as in this country. In growing Dale's variety, the Egyptian month of sowing was tried. This resulted in the plants flowering and podding early in the rains. The rainy season crop of pods of course rotted before coming to maturity, but as the plants went on flowering for some time after the rains ceased, quite sufficient pods set and ripened to give the plants the appearance of carrying a heavy crop in December-January, or at the same time when the local rainy season sowings were being harvested. As I do not find it on record anywhere, that very early sowing of cotton has ever been tried in India, it is, I consider, worth while for Superintendents of experiment farms to try the effect of very early sowing upon all the American and Egyptian varieties.

Germination of Cotton Seed.

Dr. J. Numa Rat, of Anguilla, has forwarded the following interesting account of experiments conducted by him with the view of testing the correctness of the idea that cotton seeds which float on water do not germinate:—

Ten banks were prepared in a small plot, and in these were sown, alternately, Sea Island cotton seeds that sank in water and those that floated. Of the 258 of the former thus planted, 178 sprouted; while of the latter 103 out of 222 germinated. It will thus be seen that 68 per cent. of the seeds that sank germinated, while the percentage of the floating seeds that germinated was only 46.

As Dr. Rat points out, the experiment shows that, while the percentage of germinating seeds is considerably lower in the case of the seeds that float, it is quite incorrect to assert that floating cotton seeds do not germinate. In spite of that they may produce weakly plants.

SCIENCE NOTES.

The Genipa Fruit.

The genipa is the fruit of a large tree, *Genipa americana*, a native of South America, which is found in certain parts of the West Indies. The tree belongs to the family *Rubiaceae*, being closely related to the cinchona. It must not be confused with the genip tree (*Melicocca bijuga*). The following description of the genipa tree and its uses is taken from Cook and Collins' *Economic Plants of Porto Rico*:—

The tree reaches a height of 50 feet, with a long, rather straight trunk, from 15 to 20 inches in diameter. It furnishes a rather soft, light wood that is, however, strong and resistant, flexible and fibrous in texture. The colour is uniformly whitish, tinged with a light reddish-brown. It resembles the ash and possesses also its properties. It is very suitable for boxes and for any work where strength and elasticity are needed. The rims of sieves and shoe lasts are made of this wood. The fruit is from 4 to 6 inches in length and oval in shape. The skin is somewhat leathery in texture and of a russet colour, irregularly mottled with grayish. The section shows it to be two-celled. The rind and the pulp, in which the seeds are embedded, are used in the preparation of one of the refreshing drinks which are such a feature in Porto Rico. It is sometimes eaten, but can scarcely be recommended. It has somewhat the flabby texture and much of the taste of dried apples. According to Schumann it contains large quantities of tannic acid.

Seeds of a large-fruited variety of the genipa tree have recently been sent to all the Botanic Stations in the West Indies by Mr. Frank D. Gardner, Special Agent-in-charge, Porto Rico Experiment Station.

Guadeloupe Jaborandi.

According to the *Pharmaceutical Journal* of November 14, a new variety of jaborandi has recently appeared on the London market. It is obtained from *Pilocarpus racemosus*, which is a native of the Antilles, growing in dry, rocky places in Martinique and Guadeloupe. It is also said to occur in the mountains of Montserrat.

The leaves afford the same alkaloids as those of the official kind (*P. Jaborandi*), viz., pilocarpine, jaborine and pilocarpidine, the total yield being 1 per cent., of which three-fifths are pilocarpine, which is rather more than that contained in the leaves of *P. pennatifolius*.

Greenish describes the uses of the drug as follows:— 'Jaborandi produces profuse salivation and perspiration, and is chiefly given as a powerful and rapid diaphoretic. It appears to be of most service in renal disease, eliminating both water and urea.'

Fixation of Atmospheric Nitrogen.

The following note on the fixation of atmospheric nitrogen appeared in *Nature* of October 29:—

The problem of turning to practical use the free nitrogen of the atmosphere for the purposes of agriculture and industry is one which has excited attention for many years past. According to a recent communication of Dr. Frank, of Charlottenburg, the fixation of atmospheric nitrogen on a technical scale can be effected through the agency of the carbides of the alkaline earth metals. Barium carbide is especially suitable for the purpose, and by the absorption of atmospheric nitrogen is converted directly into barium cyanide. The reaction with calcium carbide proceeds differently, the product obtained being calcium cyanamide, which, however, by heating with water under high pressure is easily converted into calcium carbonate and ammonia. Experiments have, moreover, shown that the calcium cyanamide can be used directly as a means of supplying nitrogen to the soil.

BANANA FLOUR.

The following note on Banana Flour, taken from the *Canadian Grocer* of September 11, may be of interest in view of the proposals that have been made for the utilization of surplus or rejected bananas:—

With the cheapening of bananas by the large increase of importation, says an English exchange, some enterprising baker might find it a good business to convert the fruit into bread. It could not be sold, of course, at the same price as wheaten bread, but from a dietetic standpoint it is accredited with very superior qualities. African travellers who have experimented with this food claim for it greater nutritive value, easier and quicker digestibility, finer flavour, and greater lightness of texture. Sir Henry Stanley, during his memorable journey up the Aruwhimi, lived chiefly on this fruit-bread, and although his baking arrangements must have been primitive, he pronounced judgement in its favour compared with the wheaten article on almost all points. Whether it is free, as alleged by some enthusiasts, from gouty constituents, must be left for the present an open question, there being little evidence on that point. But if half the other claims advanced for it are true, it would seem to be just the sort of diet for convalescents and invalids, who have need to recuperate physically before their digestive organs can get into thorough working order. They would be willing enough to pay liberally for any form of food satisfying these requirements, and if banana bread would do that, its experimental introduction as an article of dietary at a remunerative price should not break down for lack of patronage.

PURE FOOD.

The following is taken from the *Louisiana Planter* of November 14:—

The United States Department of Agriculture, under the existing pure food law, is now actively engaged in determining what constitutes the standard of purity in our food products, and it has recently submitted to the commercial exchanges and others a tentative schedule of what the department is disposed to construe as pure food.

In regard to sugar and related substances, the present schedule of standards is as follows:—

Standard sugar is white sugar containing at least ninety-nine and five-tenths (99·5) per cent. of sucrose and without any added substance.

Standard molasses is molasses containing not more than twenty-five (25) per cent. of water nor more than five (5) per cent. of ash.

Standard syrup is a syrup containing not more than thirty (30) per cent. of water nor more than two and five-tenths (2·5) per cent. of ash.

Standard 70 sugar or brewers' sugar is hydrous starch sugar containing not less than seventy (70) per cent. of dextrose and not more than six-tenths (0·6) per cent. of ash.

THE DAIRY INDUSTRY IN PORTO RICO.

The United States Department of Agriculture has issued a report by Mr. Raymond A. Pearson, Assistant Chief of the Dairy Division, on 'The Dairy Industry and Dairy Markets in Porto Rico.' As the condition of this industry in Porto Rico is very similar to that in some of the British West Indian Islands, it is probable that extracts from Mr. Pearson's summary and recommendations will be useful and interesting to stock-keepers throughout these islands:—

Cows are kept for their increase; the milk which is taken for household and commercial purposes is considered of incidental value only. Many of them are kept until eight or ten years old, when they are turned over to the butcher. As is the almost universal practice, the cows are milked only once a day, the calf always being on hand to help 'start' the milk. After milking, the cows and calves go to pasture and remain together until afternoon, when the calves are separated. If they are quite young, they remain with the cows until late in the day, but when a few months old, they are taken away early in the afternoon. At dusk the cows are brought to a yard near the milking shed, where they are kept all night.

It is easy to see many features of Porto Rican dairying which might be improved. Numerous radical changes would be necessary to bring about the best results. The writer endeavoured to persuade the owner of a dairy, who seemed very anxious to learn American methods, to employ immediately for his manager some person trained in the States, but was unsuccessful; it is probable, however, that such a person will be employed in the near future. From a dairy standpoint, the stock needs to be greatly improved. The fact that individuals vary so widely in dairy qualities is encouraging. One could easily collect a small herd of cows, giving 6 to 8 quarts or more each, and by intelligent selection, breeding, rearing, and management, develop much better milkers in the course of a few years. Better management would include, first of all, different treatment of the calves. The present practice, as has been shown, is to allow the calves to be with their mothers a few hours after each milking, then separate them, and give them nothing, or almost nothing, until after the cow has been partially milked the next day, when the calves are allowed to take all they can get, and this is usually the 'strippings.' It is not strange that a large number of calves die. At one dairy it is said about half the calves die within a few months after birth. They gave appearance of being a badly starved lot, and it is probable very little milk was left for them. If the system of feeding calves were objected to for no other reason, it may be severely criticised because there is no way of knowing how much the calf gets. A milker who attempts to leave one-quarter of the milk may leave twice or half that amount; he has no way of measuring the quantity.

The belief that it is absolutely necessary for calves to remain with the cows is almost universal. The fact that, when the calf is lost the cow is liable to go dry soon, is taken as proof positive that the calf cannot be dispensed with. A few cow owners who had seen or learned a little about modern dairy methods believed cows might be trained to give milk without having their calves beside them, but an actual experiment was not heard of. It would probably be as difficult to teach most cow owners as the cows that it is best to remove the calves immediately or within two or three days after they are born and raise them on skimmed milk and meal, milking the mother regularly twice each day. After practising the 'natural method' many generations, an innovation of this kind might be made only with difficulty.

Undoubtedly the quickest and most satisfactory way to obtain a herd of good milch cows in Porto Rico would be to take them there from the States, where, for a reasonable price, cows can be had that will give an average of 10 quarts of rich milk daily for ten or eleven months each year—cows that are trained to give all their milk to the milker and not a large part of it to the calf. But it would be useless for anyone who does not understand modern dairy methods to possess such stock, as it would quickly deteriorate in his hands. The importation of only a few animals might form the basis of a large and profitable herd. If crossed with the best natives, an excellent strain might thus result. Knowledge of modern methods is the thing of first importance; after that the introduction of high-grade stock.

The practice described above, of allowing the calf to run with the mother, and the belief that it is absolutely necessary that this should continue in order to obtain milk for household purposes obtain also in some of the British Islands. It is purely a question of training and habit. Excellent milking cows in Barbados give their milk without the presence of the calf and a full supply is regularly obtained for household purposes. The calf is separated immediately after its birth and is reared with little or no trouble. Where it is proposed to change the system in force at Porto Rico and elsewhere, a few cows from Barbados might be introduced for the purpose. They are usually small animals of the Alderney type, but good milkers and very tractable.

PREHISTORIC IMPLEMENTS OF BARBADOS.

We extract the following from an interesting letter just received from Colonel H. W. Feilden, C.B., of Burwash, Sussex, addressed to the Imperial Commissioner of Agriculture:—

I think the prehistoric implements of Barbados have not received the attention they deserve. I have never heard it suggested, but cannot help thinking, that the Caribs used the shell-hoes, made from the semi-fossil shell of the Conch (*Strombus Gigas*) in their cassava gardens, and judging from the enormous number of these implements that have been found in the low-lying grounds, the numbers of inhabitants and the area under cultivation must have been considerable.

Plant Intrdouctions. Much interest attaches itself to the question of the introduction of foreign plants and their acclimatization to the changed conditions of their new environment. This is particularly true when the change is so great as that brought about by the introduction of a temperate plant into the tropics, or vice versa. There are, however, some temperate plants which are able to adapt themselves to life in the tropics and to flourish in this unnatural habitat. In Barbados, for instance, the common English sowthistle (*Sonchus arvensis*) is quite frequent in some parts of St. Michael's parish where it flowers and produces seed abundantly. At Clapham estate, St. Michael's, Barbados, another plant introduction was recently noticed, that of a species of *Veronica*, the English speedwell. This little blue-flowered stranger was accidentally brought over from England with some other plants; it was planted, and is now growing freely. It is already producing flowers and fruits, and appears quite at home in its new surroundings.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

Communications are invited, written on one side of the paper only. It should be understood that no contributions or specimens can, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found at foot of page 415 of this issue.

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NOTES AND COMMENTS.

The 'Agricultural News.'

With the present issue the second volume of the *Agricultural News* is brought to a close, in accordance with the plan announced on p. 6 of this volume.

A complete index to Volume II is in course of preparation, and will shortly be issued, together with a title page, etc.

Varieties of Cacao.

In the current issue of the *Bulletin of the Department of Agriculture, Jamaica,* there appears an interesting and instructive article on the 'Budding of Cacao.' Detailed instructions are given as to the mode of carrying out the operation; and it is suggested that since the operation of budding is so simple, the cacao planter has a ready means of ensuring that all the trees on an estate are of 'one approved variety.'

Referring to this paper the Jamaica *Daily Telegraph*, of December 1, publishes information relative to the three varieties of cacao grown in Jamaica—the Forastero, the Criollo, and the Calabacillo. The last named is the hardiest of the three, but at the same time its product is the least valuable. The Criollo, on the other hand, is the variety which gives the highest price, but it is found to be delicate and to grow only in particularly favourable situations. The Forastero is intermediate, both in the value of its product and its cultural requirements, and hitherto it has been the policy of the Agricultural Department to recommend this variety as being, on the whole, best suited to conditions in Jamaica. Planters have also been frequently reminded of the necessity of seeing that they have only one variety on an estate, since it is impossible for fermentation to be carried on successfully if the produce of different varieties, taking different times to ferment, is mixed.

As the superior value of Criollo cacao has undoubtedly been proved, it is suggested that planters will now be able to bud from Criollo trees on to the Calabacillo and Forastero trees already growing. A few Criollo trees can be grown on each estate, in favourable situations, to supply the necessary material for budding.

Cotton Experiment Plots at St. Vincent.

A report has recently been received by the Imperial Commissioner of Agriculture on the cotton experiment plots at St. Vincent, prepared by Mr. T. Osment, the Agricultural Instructor. It appears that the growth of the cotton plants is, on the whole, very satisfactory. It is reported that in nearly every instance the growth of the Sea Island cotton is more vigorous than that of the Upland.

At Belair it is recorded that there is an average of 100 pods and flowers per tree. No serious damage by insect pests has occurred, although the red cotton stainer appears to be fairly common in some localities.

A notice has been issued to cotton planters advising them to report to the Department any disease or insect attack on their plants in order that directions may be immediately given for dealing with them. Special attention is drawn to the cotton worm and the red cotton stainer. Spraying machines, Paris green and other materials are available for dealing with these and similar pests.

Gambier in the West Indies.

In view of the fact that inquiries have recently come to hand from Dominica with regard to the possibilities of gambier cultivation, the following information, extracted from an article in the *West Indian Bulletin* (Vol. IV, pp. 80-5), may be of interest:—

Gambier is a valuable tanning material obtained from the leaves of a plant (*Uncaria Gambier*) cultivated largely in the Straits Settlements. It is obtained by boiling the leaves of the plant and is chiefly used for tanning and dyeing. The finer qualities are also employed in medicine on account of valuable astringent properties.

In 1891, attempts were made to introduce this plant into the West Indies. An interesting account of these efforts will be found in the *Agricultural News*, Vol. II, p. 158, from which it will be seen that the experiment was not successful.

It is possible that further attempts to bring this plant into cultivation in these islands might be successful, but at present it appears that gambier cultivation is not suited to the conditions existing in the West Indies. The success with which this plant is cultivated in the Malay States is largely due to the cultivation being in the hands of a depressed class of Chinese, who set practically no value on their labour and grow gambier only as a catch crop with pepper.

Rubber Planting in the Far East.

It is stated in the *India Rubber World*, of November 1, that an estimate has recently been made by the publishers of the *Tropical Agriculturist* of the extent of rubber planting in Ceylon. The total area planted in rubber trees (chiefly *Hevea*) is estimated at 11,630 acres. The number of trees on this area is believed to be from 3,500,000 to 4,000,000; but it is difficult to obtain an exact estimate on this point, because the distance at which the trees are planted varies, and also because more than half the area mentioned is also planted in tea.

The *Tropical Agriculturist* also estimates that there are about 3,000,000 rubber trees in the Straits Settlements (including the Federated Malay States) covering some 16,600 acres. Of these trees probably a third are five years old or over.

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Jamaican Fodders.

The November issue of the *Bulletin of the Department of Agriculture, Jamaica*, contains an article by Mr. H. H. Cousins, M.A., F.C.S., on 'Jamaican Fodders.'

Interesting and useful notes are given as to the composition and food value of several common fodders, namely, Guinea grass (*Panicum maximum*), Para grass (*Panicum muticum*), Pimento grass (*Stenotaphrum americanum*), Spanish needle (*Bidens leucantha*), Bread-nut (*Brosimum Alicastrum*), Ramoon (*Trophis americana*), and Guango (*Pithecolobium Saman*).

An important point brought out in this paper is the great tendency for these fodder plants to vary in composition, according to the soil and district in which they are grown. Thus, Mr. Cousins points out that Guinea grass from St. Mary had very little more value as a fodder than good oat straw, while the sample obtained from St. Ann was equal to good Timothy grass. Similar variation is noticed in the case of Para grass which has a high feeding value in those districts to which it is suited.

It is claimed for the Spanish needle that it is an excellent fodder for horses in poor condition and acts as a slight purgative. The analysis shows that it contains a considerably higher percentage of albuminoids than any of the grasses analysed. It has also given good results as a green manure on banana properties. Bread-nut fodder, made up of the nuts and young shoots, is another valuable food stuff, containing an unusually high proportion of nitrogenous matter. The results of analyses of young shoots of ramoon and of pods and seeds of the guango are also recorded. Of the former, Mr. Cousins says, 'the ramoon from Westmoreland holds pride of place in this series and must be considered of high nutritive value.' With regard to the pods and seeds of *Pithecolobium Saman*, these analyses confirm the statement made by Professor Harrison in his *Report on the Agricultural Work for the years 1896-1902*, that the figures given in the analysis of the pods are misleading on account of the seeds escaping digestion.

Agriculture in Dutch Guiana.

According to the *Consular Report* on the trade and agriculture of Dutch Guiana, the chief agricultural exports of the colony are cacao, sugar and rum, coffee and balata. Cacao is the most important industry, although the last crop was very unfavourable. It is thought that much might be done to improve the industry by higher and more scientific cultivation. Trees suffer greatly from the disease, known as 'Kroloto,'—which is the same as that described in the *Agricultural News*, Vol. II, p. 117, under the name of 'Witch Broom disease'—but little or no trouble is taken to check it. Diseased pods and branches, instead of being buried or destroyed by fire, are left lying on the ground. The balata industry was more prosperous during the year under review than it has been for several years past, the amount brought into Paramaribo being 321 tons, against 237 tons in 1901.

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Cacao in Fiji.

The following extract from a letter from Messrs. Powell Bros., Lami River estate, Suva, Fiji, to the Imperial Commissioner of Agriculture, dated July 20, 1903, relating to the varieties of cacao in Fiji, is of interest:—

'In the *Journal of the Jamaica Agricultural Society* for May 1903, we find a reference to cacao which very much interests us and we should thank you very much if you would let us know whether what is stated there is true with regard to the inside of the bean of the pure Criollo being milk-white in colour. If such is the case, it is most important that we should endeavour to find some means of importing this variety into this colony, and perhaps you would help us in this matter.

'There appear to be some half a dozen varieties in Fiji brought together by the late Sir J. B. Thurston; but at his death all record was lost and the trees are now quite wild in the forest. Most of these beans when split are purple, some very dark, but we have one dwarf tree the leaves of which are very much smaller than any others. This tree carries a small yellow pod deeply furrowed and pointed, the bean when cut is very much lighter than any others, in fact is a pink colour.

'We are carefully saving and propagating the seed from this tree, but are much surprised to find a description of a still lighter coloured cacao, which is of course what we want to produce, the highest marketable product; and if you can help us in the matter we shall feel exceedingly obliged.'

To this the Imperial Commissioner of Agriculture replied, that it was an essential feature of the Criollo variety that the inside of the bean is of a white or pale colour, and while he promised to obtain a few pods of this variety for Messrs. Powell Bros., he doubted whether they would travel safely to Fiji.

Notes on the three varieties of cacao grown in Jamaica will be found on page 408 of this issue. It is there stated that while the Criollo variety gives the most valuable product, it is not nearly as hardy as the other varieties, and great care has to be exercised in the choice of soil, locality, etc.

INSECT NOTES.

Lady-birds in the West Indies.

A few years ago the fruit-growing industry of California suffered severely from the attacks of the fluted scale (*Icerya purchasi*). Among the many remedies and means of control which were tried were the natural enemies of the scale. Agents of the United States Department of Agriculture and the California Board of Horticulture collected and sent to California several species of lady-birds. Among them was one called the Australian lady-bird (*Vedalia cardinalis*), which, by its voracious feeding, has brought this very destructive scale under complete control. This experiment was so successful that many other attempts at controlling insect pests by means of their insect enemies have been made.

One of the greatest difficulties experienced in these experiments is found in the matter of transporting the lady-birds to their new homes and getting them established. The Government Entomologist of Cape Colony imported several lots of lady-birds from the United States, but many of them died on the long journey in spite of the most careful precautions.

There are several species of lady-birds known in the West Indies, and the Entomologist of the Imperial Department of Agriculture is about to undertake a special study of these species. A circular letter has been sent to the Curators of the Botanic Stations in the Leeward and Windward Islands and others, and it is hoped to obtain living specimens of all the different lady-birds to be found in these islands. They will be kept and fed and an attempt made to learn the complete life-history of each. Further, experiments will be conducted with different foods. It is known that two of our most common species are exceedingly destructive to the cotton aphis; but it is not definitely known how much good they do by their habit of feeding on scale insects, and as scale insects are among the worst of our pests, the attempt will be made to find out which of the lady-birds are their most active enemies.

It is hoped that any one in the West Indies who is interested will assist in this matter by sending to the Imperial Commissioner of Agriculture, Barbados, such lady-birds as they may be able to collect, together with information as to habits, food, etc.

The following directions for collecting and forwarding lady-birds are taken from the circular letter referred to above:—

Lady-birds generally appear upon any plants infested with plant lice (*Aphidae*) or scale insects (*Coccidae*). They may be seen walking about on the infested leaves or branches and can quite readily be captured, or they may be taken by beating, which consists in holding an inverted umbrella under a bush or branch of a tree and beating upon the latter with a stout stick. The beetles will fall into the umbrella and can then be captured.

They may be forwarded in small wooden or card boxes, such as pill boxes, which should be carefully packed in a larger, strong box. Not more than twenty beetles should be put in a box and each kind should be kept separate. A small piece of blotting paper, crumpled up so as loosely to fill the box, should be put in to afford the insects a foothold.

If it becomes necessary to keep the beetles several days they should be fed upon plant lice and the boxes should be packed as near to the closing of the mail as possible. A leaf or twig, infested with plant lice or scale insects, might be put into each box to furnish food for the beetles during the journey.

COCOA-NUT BREAKING MACHINE.

Attention has been drawn in the *Agricultural News* (Vol. II, p. 231) to the desirability of a machine being invented for breaking cocoa-nuts and removing the kernels. The *Board of Trade Journal*, of October 15, has the following communication from a Trinidad correspondent dealing with this matter:—

It is questionable if a machine can be devised to remove the kernel of the split nut on account of the different degrees of tenacity with which the kernel holds to the shell. This, however, is a small matter, compared to the splitting of the nut.

The essentials of a cocoa-nut-splitting machine which are generally overlooked are (1) portability, which necessitates the splitting machine and motor being one unit, and (2) simplicity of operation.

1. Husks and shells constitute 75 per cent. of the total weight of the nut, and about 85 per cent. of the bulk, hence the necessity of carrying the machine to the nuts and not the reverse, as was attempted hitherto. As the crop per picking does not exceed 800 lb. of kernel per acre, tram lines or even good roads are obviously out of the question on a cocoa-nut estate.

For these reasons, to satisfy the cocoa-nut planter a splitting machine with motor should not exceed 10 cwt., so that with cart or truck the total weight should not exceed 16 cwt.

2. Skilled labour on cocoa-nut estates is not of high quality, is unreliable and expensive, so both motor and machine should be of simple construction and not liable to get out of order even when operated by unskilled labour.

Notwithstanding the available supply of cheap fuel in the shape of husks and shells, a steam plant has serious disadvantages on account of the danger of having the boiler under the care of an unreliable attendant, the difficulty of getting good water in many places, and its weight; the preference would therefore be given to an oil engine as motor, wherever it is possible to get crude oil at a reasonable price.

The most serviceable size of machine would be one of a capacity of about 8,000 nuts per day, which would deal with a crop of 2,000,000 nuts per year, work generally being carried on for ten months per annum on cocoa-nut estates.

West Indian Violet. Mr. John Belling, B.Sc., writes: 'On the bare tops of the mountain ridge of St. Kitt's the blue and white flowers of a violet (*Viola stipularis*) are seen among the fern, brought up to the light by its long stem. Forty years ago this violet was only known here and at Martinique and Venezuela.'

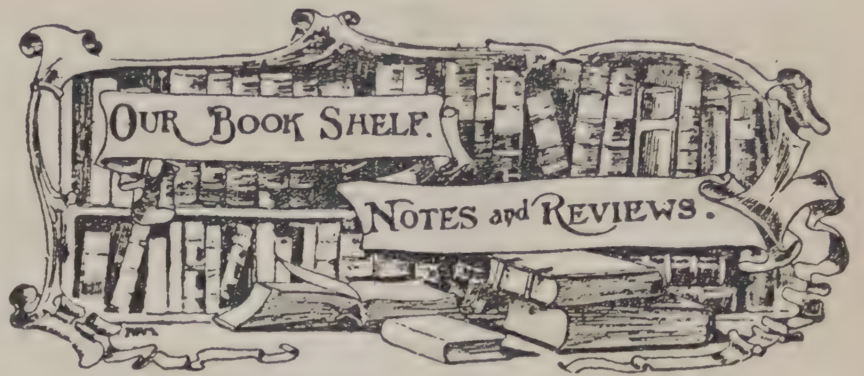
EDUCATIONAL.

Agricultural Instruction in Germany.

An interesting and important *Consular Report* has recently been issued; it is entitled: 'Agricultural Instruction in Germany and the development of German Agriculture and Agricultural Industries,' by Dr. Frederick Rose, His Majesty's Consul at Stuttgart. In the portion of this report dealing with education, a detailed account is given of the German system of agricultural education, as well as the history of the development of the various institutes for the teaching of scientific agriculture.

The following brief extracts will serve to show the importance attached to agricultural education and the great influence its various agencies have had upon German agriculture:—

> At the present day in Germany there is no branch of agricultural management, no branch of special agricultural production, for which special facilities for instruction are not provided. The expenditure of the German States for agricultural instruction in its three stages—advanced, secondary, and elementary—is considerable; for Prussia alone, about £75,000 annually. But this State expenditure for the furtherance of agricultural instruction is certainly a profitable investment, as probably no country has benefited more than Germany by the application of agricultural science to practical agriculture, through the means of agricultural higher, middle, and lower schools.
>
> The agricultural industries owe an important debt to the instruction given at the agricultural high schools and institutes. As has been already shown in this report, the instruction afforded for the agricultural industries comprises not only the technical methods employed in the manufacture, but goes further and deals exhaustively with the cultivation of the agricultural raw products. The interests of the different branches of the industries themselves are, moreover, safeguarded by powerful unions whose experimental institutes are often attached to the higher agricultural schools.
>
> The agricultural experiment and testing stations were founded during the latter half of the nineteenth century, as the result of the new theories enunciated by Liebig in his various works. . . . . The total number of these stations amounts to about seventy, of which fifty-eight are incorporated in the 'Central Association of German Agricultural Experiment Stations,' which was founded in 1898. These stations are distributed all over Germany, partly as independent establishments, partly connected with agricultural high schools and institutes.
>
> Between agricultural, mining and industrial production, however, essential differences exist. Continued mining exhausts the resources of the earth, industrial works but fashion raw stuffs and materials into finished goods; it is agriculture, which based upon the vital principles of plant and animal life, creates values, which, when exhausted, are returned to the soil whence they emerge again to undergo indefinitely the same ever-recurring transformation. This special attribute of agriculture has been amply demonstrated during the past century, notably in Germany, by doubling and trebling its values and providing, up to the last quarter of the previous century at least, food and labour for a population which has doubled in number. And these results are, beyond doubt, partly owing to the increase and spread of agricultural instruction.


Our Book Shelf.
Notes and Reviews.

THE SUGAR-CANE IN EGYPT. By Walter Tiemann. *Altrincham: Office of the 'International Sugar Journal,' 1903.* Price 5*s.* net.

This interesting book is devoted to the cultivation of the sugar-cane—for the most part under irrigation—in Egypt. The first four chapters deal with the general cultivation, methods adopted, sugar content of Egyptian canes, tillage, manuring, etc. In the succeeding chapters the author gives an account of his manurial experiments. The excellent illustrations in this part of the book enable the reader to appreciate at a glance the value of the results obtained. The writer states that 'nitrogen, phosphoric acid and potash are not, in general, available in sufficient, efficacious quantities in the soil so as to allow the cane to achieve the best results, and every prudent planter will supplement them by the purchase of artificial manures in definite amounts'. The value of these results to the Egyptian planter is, therefore, obvious. Nitrate of soda, basic slag and sulphate of potash are the forms in which the three chief plant foods are most effectively supplied.

This book can thoroughly be recommended to planters in the West Indies, not that the results therein reported are particularly applicable to West Indian conditions, but for the sake of obtaining a clear idea of the methods adopted in laying out experiments.

PAINT FOR WOODEN ROOFS, ETC.

The following is the formula for a paint which is recommended for use on potting sheds, stables, fowl houses, etc:—

Green tar	1 gallon
Boiled linseed oil	1 gallon
Red ochre	5 lb.
Resin	2 lb.
Litharge	½ lb.

Pulverize the resin, heat the mixture and apply hot.

This paint was recommended for buildings at the Agricultural School at St. Vincent, and the Resident Master reports that it has given most satisfactory results. It was found possible to obtain all the materials locally.

DEPARTMENT NEWS.

Mr. Henry Powell, Curator of the Botanic Station at St. Vincent, has been appointed by the Secretary of State for Foreign Affairs, Agricultural Officer at Mombasa, under the Administration of the East African Protectorate. Mr. Powell has been in charge of the St. Vincent Botanic Station for thirteen years, and has during that time proved himself an enthusiastic and capable officer, whose efforts for the promotion of agriculture in St. Vincent have been widely appreciated.

GLEANINGS.

The British Cotton Growing Association, at the instance of the Imperial Department of Agriculture, has granted a hand gin and a hand baling press for the island of Anguilla.

The following recipe for 'Black Bruise Oil,' in which Barbados tar is an ingredient, is given in the *Pharmaceutical Journal* of November 14:—Barbados tar, ½ ℔.; linseed oil, 2 ℔.; oil of turpentine, 1½ ℔.; green oil of elder, 1 ℔.; sulphuric acid, 2 oz.

Mr. W. M. Smith, Acting Agricultural Instructor at Grenada, writes that very little cotton has been planted in that island this year. The total crop is not likely to exceed 20 bales. At Carriacou, a dependency of Grenada, cotton is practically the only industry.

According to the Jamaica *Gleaner*, of November 25, a deputation representing the orange growers of the parish of Manchester recently waited on his Excellency the Governor for the purpose of endeavouring to secure a reduction in the rates of charges for the carriage of oranges on the railway. As a result of this deputation, the Governor has sanctioned a reduction of 6*d*. per barrel for oranges by the car load.

A correspondent, writing in *Indian Planting and Gardening*, of October 24, states that he recently came across an old native *mali* who was in the habit of treating small seeds by rubbing them between the palms of the hands with dry country tobacco before sowing them. He held that seeds so treated were never attacked by insects. This method certainly deserves a trial.

The *Agricultural Bulletin of the Straits Settlements* records the fruiting of *Ravenala madagascariensis*, commonly called 'The Traveller's Tree,' in Borneo, at an altitude of 1,000 feet. Mr. H. N. Ridley writes that this is the only record he has of the fruiting of this tree in the East. It has, however, been known to fruit in Ceylon. It would be interesting to know if there are any instances of its fruiting in the West Indies.

In the *Colonial Report* on Ceylon for 1902, the following reference is made to the citronella industry: 'The exports show a falling off of about 15 per cent. The continual adulteration of this oil with kerosene and other cheap oils, which are difficult to detect, has lowered the value of this oil, and the price, about 9*d*. per ℔., does not make this cultivation sufficiently remunerative. Until, by means of putting sound oil on the market, a clean name is obtained for the Ceylon article, it cannot be hoped that the best prices, often 1*s*. 3*d*., can be obtained. There is a large demand for this oil, if pure.'

The Imperial Commissioner of Agriculture has received from the Government of St. Lucia a fine specimen, preserved in spirit, of the snake known as the 'Fer-de-lance,' for transmission to the British Museum (Natural History). The specimen is 6 feet 2 inches in length and measures 12 inches in girth. It is believed that this snake is now becoming almost extinct in St. Lucia owing to the destruction of the young by the mungoose. It is singular that it has been found in no other British island in the West Indies.

In a report to the Imperial Commissioner of Agriculture on a visit to the Botanic Station at St. Kitt's, Mr. G. Whitfield Smith, Travelling Superintendent, remarks that operations at the Botanic Station have been much retarded during the past eight months by the severe drought. During the ten months—January to October—only 23 inches of rain were recorded and of this amount 8 inches fell during October. It may be pointed out that during the seven months—April to October 1902—the rainfall was 33·36 inches.

The *Consular Report* on the Gold Coast for 1902 has the following:—'Although 5 per cent. more rubber was exported than in 1901, 15 per cent. less value was realized. The wholesale destruction of trees and vines by the natives, due to the unskilled methods adopted by them in the extraction of the latex, and the low prices now realized in Europe, are the factors which have conduced to the decline of this, once staple product. An effort is being made to teach the native how to tap the trees and vines without injuring their vitality or growth.'

In the November issue of the *Agricultural Journal of the Cape of Good Hope* there is an important article on 'Cold Storage for Fruit.' In this article correspondence is published between the Union Castle Mail Company and its representatives at New York and Cape Town. The whole matter of cold storage of fruit has been gone into by the company, and the experts consulted lay great stress, among other things, on the necessity of the fruit being thoroughly cooled down before packing, and being kept cool during transit to the docks.

In an interesting article on 'Cotton Growing in Madras' in the *Indian Review*, the Hon. Mr. Perraza states that India has to import the long-stapled varieties of Egyptain and American cotton. In the year 1900-1 the importation of such cotton reached 173,338 cwt. In conclusion the writer expresses the hope that something will be done not only to increase the yield but also to improve the quality 'to a standard that would secure to our cotton the place it had lost in the English markets.'

Through the courtesy of the Chairman (the Hon'ble F. Watts), we have received the report of the Central Committee appointed to make arrangements for the celebration of Arbor Day in Antigua. Six local committees made arrangements for celebrations in their respective districts. The following trees were planted in St. John's:—Twenty-eight mahogany trees in the Ladies' Avenue along the road leading out of St. John's to Scott's Hill; twenty-one mahogany trees in the Elementary Schools' Avenue along the road leading through Victoria Park; four whitewood trees in the Buxton Grove College grounds, and twelve royal palms in the Grammar School grounds.

WEST INDIAN PRODUCTS.

West Indian Produce Association.

A circular letter has been received by the Imperial Commissioner of Agriculture from the Secretary of the West India Committee regarding the formation of a Produce Association, 'with the object of furthering the sale of, and stimulating the demand for, all kinds of West Indian produce.' It is proposed that the Association shall be under the direct auspices of the West India Committee.

The circular further submits certain questions to its correspondents and others in the West Indies, to whom the circular is sent, with the view to ascertaining what amount of support the proposals would receive in these islands.

The following extracts from the circular are of interest:—

That the formation of such an Agency would be of the greatest advantage to the West Indian Colonies, and would benefit equally sugar growers, fruit growers, proprietors, and peasants, we are most firmly convinced, and we feel that the present is a favourable time for its inception, when there is every prospect of a renewed interest, a revival of trade, and an increasing prosperity in the West Indies; but before taking any definite steps in the matter, we are anxious to ascertain, through the representative commercial and planting bodies, the opinion of the West Indian Colonies, for we are confident that to ensure complete success close co-operation is absolutely essential.

You will note that we have put forward no definite scheme at present, but we are merely anxious to ascertain whether such a movement, on a large scale and with official support, would meet with approval. Our desire is to sound the colonies on this point, and if replies received are favourable, we shall then endeavour to place before them more definite proposals.

We are of opinion that such an Association, if well organized and heartily supported by all the leading people in these colonies, would be calculated to be of great and permanent benefit to the West Indies.

West Indian Products at Boston.

The following extract from a letter addressed to the Imperial Commissioner of Agriculture by Mr. J. W. Springer, formerly of Barbados, dated Boston, Mass., September 14, 1903, would appear to indicate that there is a possible future for various West Indian products, especially the sweet potato, in the United States:—

In Boston I find that an inferior quality of sweet potato, imported in small quantities from the South, is sold by most grocers at the rate of 8 ℔. for 25c., and a better quality at 5c. per ℔. It seems to me that Boston will afford a favourable market for sweet potatos.

The American Importing and Transportation Company, of whom I inquired as to the possibilities of a provision trade between Boston and Barbados, requested me to obtain quotations for sweet potatos and yams and any other tropical products which might be had from Barbados.

AGRICULTURAL SHOWS.

School Show at Tobago.

Mr. Henry Millen, Curator of the Botanic Station at Tobago, has communicated the following note on a School Show held in Tobago on November 18:—

There were twenty-four classes for vegetables, etc., and the number of entries was 122 for native vegetables, most of the exhibits being good. The entries for European vegetables and for flowers were few. Plants for decorative purposes were sent from the Botanic Station. The Curator and the Agricultural Instructor acted as judges and also addressed the teachers on agricultural topics.

Forthcoming Shows.

Arrangements are being made for the holding of the following Shows:—

Antigua: February 1904.

Barbados: The Local Industrial Exhibition and Show of Stock for Peasant Proprietors will be held at Lower Estate, St. Michael, on January 12, 1904.

The Annual Agricultural and Industrial Exhibition of the Barbados General Agricultural Society will be held at Harrison College, Bridgetown, on Tuesday, December 22.

Dominica: Sixth Annual Show to be held in February 1904.

Jamaica: The Annual Show of the local branch of the Agricultural Society will be held at Savanna-la-Mar on January 1, 1904.

According to the *Journal of the Jamaica Agricultural Society*, it is not likely that any other Shows will be held before the end of the present financial year on account of the effects of the hurricane.

Montserrat: The Fourth Annual Show, under the auspices of the Imperial Department of Agriculture, will be held in the Market during the month of February 1904.

St. Vincent: It is proposed to hold an Agricultural Show on March 10, 1904.

TOBACCO EXPERIMENTS IN CUBA.

The *Consular Report* on the trade of Cuba for the year 1902 refers as follows to experiments in affording artificial shelter to growing tobacco:—

Opinions differ as to the success which has attended the experiment. The persons whom I have consulted on the subject seem, however, to agree on the following points:—

1. Tobacco grown under cover yields a far larger proportion of wrappers than that grown entirely in the open.
2. The colour of the leaf is lighter, and for this reason more acceptable, when made up into cigars, to the European, and especially the British, market.
3. The gain in the texture and colour of the leaf is to some extent off-set by a loss in flavour.
4. The awning serves to check the rapid evaporation of moisture from the soil and is, therefore, advantageous when the season is a dry one, but accentuates the bad effects of too much rain.
5. It most effectually protects the plants from insects.

In view of the somewhat contradictory nature of these facts and of the undoubtedly heavy expense attending the first erection of the awnings, it is evident that the experience of several seasons is needed to determine conclusively, whether or no the system can be considered to be a success from a commercial standpoint.

MARKET REPORTS.

London,—November 24, 1903.—Messrs. Hales Caird & Co., Messrs. E. A. de Pass & Co., Messrs. Kearton, Piper & Co.; 'The Liverpool Cotton Association Weekly Circular', November 20; and 'The Public Ledger,' November 21, 1903.

Aloes—Barbados, 13/- to 35/-; Curaçoa, 14/- to 30/- per cwt.

Arrowroot—St. Vincent, 1¾*d.* to 3½*d.* per ℔.; Bermuda, 1/3 to 1/8 per ℔.

Balata—1/9 to 2/3 per ℔.

Bees'-wax—£7 10*s.* to £7 15*s.* per cwt.

Cacao—Trinidad, 67/- to 73/- per cwt.; Jamaica, 48/6 to 63/- per cwt.; Grenada, 51/- to 64/6 per cwt.; Dominica, 53/- to 57/- per cwt.; St. Lucia, 49/- to 60/- per cwt.; Demerara, 64/- to 65/- per cwt.

Cardamoms—Mysore, 7*d.* to 3/2 per ℔.

Coffee—Jamaica, 33/- to 110/- per cwt.

Copra—Trinidad, £15 15*s.* per ton, c.i.f.

Cotton—West Indian, 6*d.* to 6⅞*d.* per ℔.

Divi Divi—£9 10*s.* per ton.

Fruit—

  Bananas—Jamaica, 7/- to 8/- per bunch.

  Grape Fruit—12/- to 13/- per case.

  Oranges—Jamaica, 9/- to 12/- per case.

  Pine-apples—No quotations.

Fustic—£3 10*s.* to £4 per ton.

Ginger—Jamaica, 37/- to 60/- per cwt.

Honey—Jamaica, 19/- to 28/6 per cwt.

Isinglass—West Indian lump, 2/3 to 2/8; Cake, 1/3 per ℔.

Kola Nuts—4*d.* to 7*d.* per ℔.

Lime Juice—Raw, 10*d.* to 1/3 per gallon; Concentrated, £13 to £13 10*s.* per pipe.

Logwood—£4 2*s.* 6*d.* to £5; Roots, £4 to £4 10*s.* per ton.

Mace—1/11 to 2/4 per ℔.

Nitrate of Soda—Agricultural, £10 per ton.

Nutmegs—69's to 60's, 2/2 to 2/10; 75's to 70's, 1/11 to 2/-; 90's to 80's, 1/5 to 1/9 per ℔.

Pimento—4*d.* to 4⅜*d.* per ℔.

Rum—Demerara, 9½*d.* to 10*d.* per proof gallon; Jamaica, 1/6 to 8/- per proof gallon.

Sarsaparilla—Jamaica, 8½*d.* to 11*d.* per ℔.

Sugar—Crystallized, 15/6 to 16/9 per cwt.; Muscovado, 12/6 to 14/6, duty paid

Sulphate of Ammonia—£12 3*s.* 9*d.* per ton.

Tamarinds—Antigua, 8/- to 8/6 per cwt.

Halifax, N.S.,—October 20, 1903.—'The Maritime Merchant.'

Ginger—Jamaica, 24c. pure bulk.

Hay—$13·00 to $14·00 per ton.

Molasses—Porto Rico, 43c. to 44c.; Barbados, 39c. to 40c.; Antigua, 33c. to 35c.; Trinidad, 44c. to 45c.

Nutmegs—50c. to 60c.

Pine-apples—$1·50 to $2·25 per dozen.

Potatos—40c. to 50c. per bushel.

St. John, N.B.,—October 20, 1903.—'The Maritime Merchant.'

Molasses—Porto Rico, 41c. to 44c.; Barbados, 38c. to 39c. per gallon.

New York,—November 13, 1903.—Messrs. Gillespie Bros. & Co.

Bananas—No quotations.

Cacao—African, 12c. to 12½c.; Caracas, 13½c. to 15c.; Jamaica, 10½c. to 12½c.; Grenada, 13c. to 13¼c.; Trinidad, 13¾c. to 15c. per ℔.

Cocoa-nuts—Trinidads, $16·00 to $18·00; Jamaicas, $20·00 to $22·00 per M. selected.

Coffee—Jamaica, fair to good ordinary, 6c. to 7c. per ℔.; Manchester grades, 8½c. to 11c. per ℔.

Ginger—Jamaica, 7½c. to 8½c. per ℔.

Goat Skins—Jamaicas, 50c. to 53½c. per ℔.

Grape Fruit—No quotations.

Onions—No quotations.

Oranges—$3·50 to $4·00 per barrel.

Pimento—7¾c. to 8c. per ℔., ex store.

Rubber—No quotations.

Sugar—Centrifugals, 96°, 3¾c.; Muscovados, 89°, $3\frac{5}{16}$c.; Molasses, 89°, $3\frac{1}{16}$c. per ℔.

INTER-COLONIAL MARKETS.

Barbados,—December 5, 1903.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $3·60 per 100 ℔.

Cacao—$10·50 per 100 ℔.

Cocoa-nuts—$10·00 per M. (husked nuts).

Coffee—Jamaica and ordinary Rio, $8·00 and $9·50 per 100 ℔. respectively.

Hay—$1·25 per 100 ℔.

Manures—Nitrate of soda, $65·00; Ohlendorff's dissolved guano, $60·00; Sulphate of ammonia, $76·00 to $85·00; Sulphate of potash, $67·00 per ton.

Molasses—No quotations.

Onions—Madeira, $3·50 to $4·00 per 100 ℔.

Potatos, English—$1·92 to $3 00 per 100 ℔.

Rice—Ballam, $4·85 per bag (190 ℔.); Patna $3·75 per 100 ℔.; Rangoon, $3·00 per 100 ℔.

Sugar—No quotations.

British Guiana,—December 3, 1903.—Messrs. Weiting & Richter.

Arrowroot—St. Vincent, $8·75 to $9·00 per barrel.

Balata—40c. to 42c. per ℔.

Cacao—Native, 11c. to 12c. per ℔.

Cassava Starch—$6·00 per barrel.

Cocoa-nuts—$8·00 to $10·00 per M.

Coffee—Rio and Jamaica, 11c. to 12c. per ℔. (retail). —Creole, 11c. to 11½c. per ℔.

Dhal—New, $3·50; Old, $3·35 per bag of 168 ℔.

Eddoes—$1·20 per barrel.

Molasses—Vacuum Pan yellow, 15c. per gallon, casks included.

Onions—Madeira, 2½c. per ℔. ex store; Garlic, 6c. to 7c.

Pea Nuts—Curaçoa, 3¾c.; American, 5c. per ℔. (retail).

Plantains—20c. to 40c. per bunch.

Potatos, English—$2·75 to $4·00 per barrel.

Rice—Ballam, $4·60 per 177 ℔., ex store; Creole 18c. to 20c. per gallon retail.

Sweet Potatos—Barbados, $1·08 per barrel.

Tannias—$2·28 per bag.

Yams—White, $2·16 per bag.

Sugar—Dark Crystals, $1·82½ to $1·87½; Yellow, $2·20 to $2·40; White, $3·50; Molasses, $1·60 to $1·90 per 100 ℔.

Timber—Greenheart, 32c. to 55c. per cubic foot.

Wallaba Shingles—$3·00 to $5·00 per M.

Trinidad,—December 3, 1903.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co.

Balata—Venezuelan, 38½c. per ℔.

Cacao—Ordinary, $13·75 to $14·00; Estates, $14·75 to $15·00 per fanega.

Cocoa-nuts—$16·00 per M. f.o.b., selected in bags of 100.

Cocoa-nut Meal—1¼c. per ℔.

Cocoa-nut Oil—55c. per Imperial Gallon (casks included).

Coffee—Venezuelan, 6½c. per ℔.

Copra—$2·25 to $2·50 per 100 ℔.

Onions—$3·50 per 100 ℔.

Potatos, English—$1·25 to $1·30 per 100 ℔.

Rice—Yellow, $4·25 to $4 60; White Table, $5·50 to $5·80 per bag.

Sugar—No quotations.

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PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain, amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied :—

(3) Seedling and other Canes, at Barbados, in 1900. Price 2*d.* Post free, 2½*d.*
(5) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d.* Post free, 4½*d.*
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